ComfortBridge™ Communicating Technology

1006-0108 Technical Training Module TRC-8

ComfortBridge™ technology

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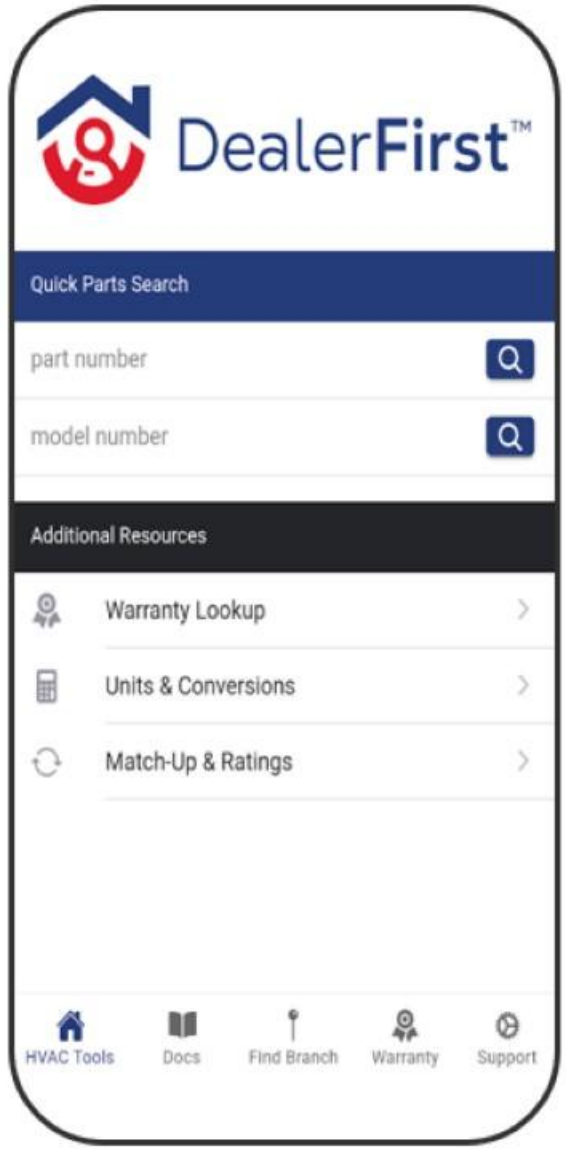
Resources

DealerFirst™ Mobile App

Quick easy, "on the go" access to:

- Warranty Express access
- Match-up and ratings
- Product/diagnostic information
- Documents, Support and more

- User Friendly Interface
- Available on Apple® App Store or on Google Play™



Download on the App Store

ANDROID APP ON Google play

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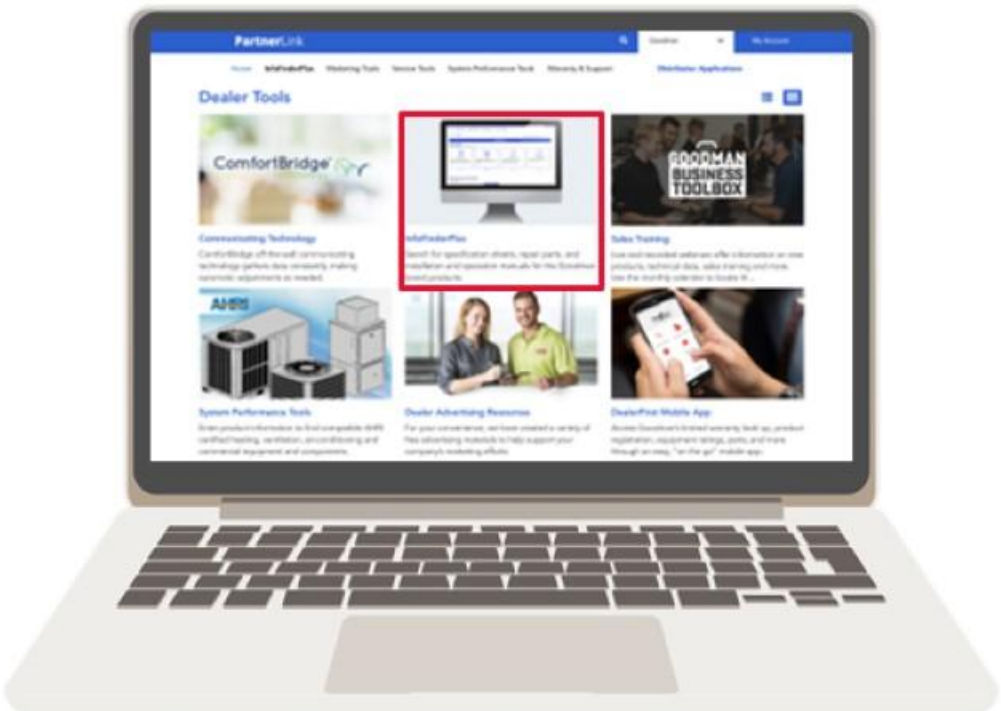
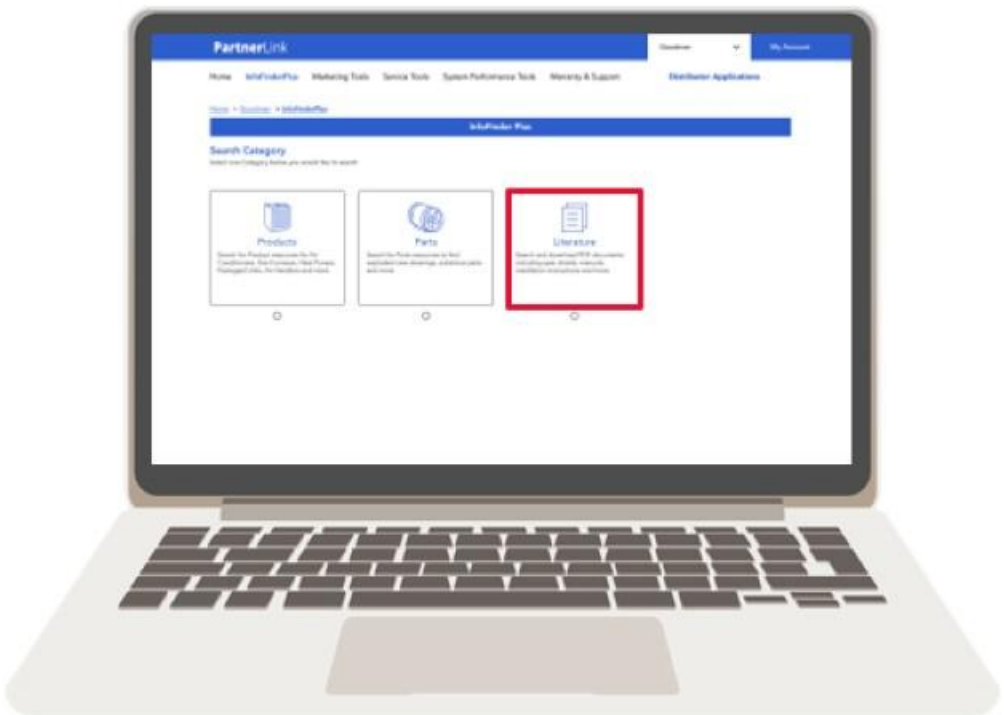
Resources

- **PartnerLink** resource for equipment manuals, information, and guides
- https://partnerlinkmarketing.goodmanmfg.com/
- Login with credentials
- Select option for “InfoFinderPlus” then “Products”





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https://www.goodmanmfg.com/terms-of-use

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Safety Considerations

Recognize These Symbols As A Safety Precaution.

- As a professional installer you have an obligation to know all safety precautions and related items.
- It is your responsibility to install the product safely and to know it well enough to be able to instruct a customer in its safe use.
- If there is a direct conflict between existing practices and the content of this manual, the manual takes precedence.

DANGER

CAUTION / WARNING

Course Content

Module 1

ComfortBridge™ Technology

Module 2

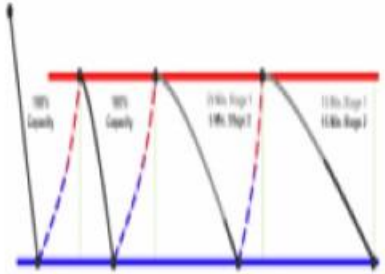
Installation

Module 3

CoolCloud™ HVAC App

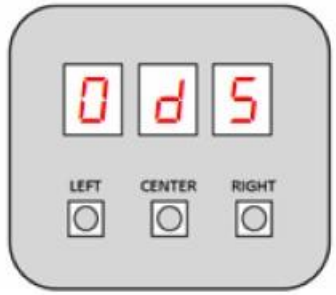
ComfortBridge™ technology

Course Content



Module 4

Control Algorithms



Module 5

Settings

ComfortBridge™ technology

Module 1

Technology

Learning Objectives

- Explain the scope of **ComfortBridge™**
- Review the **ComfortBridge™** equipment and Accessories

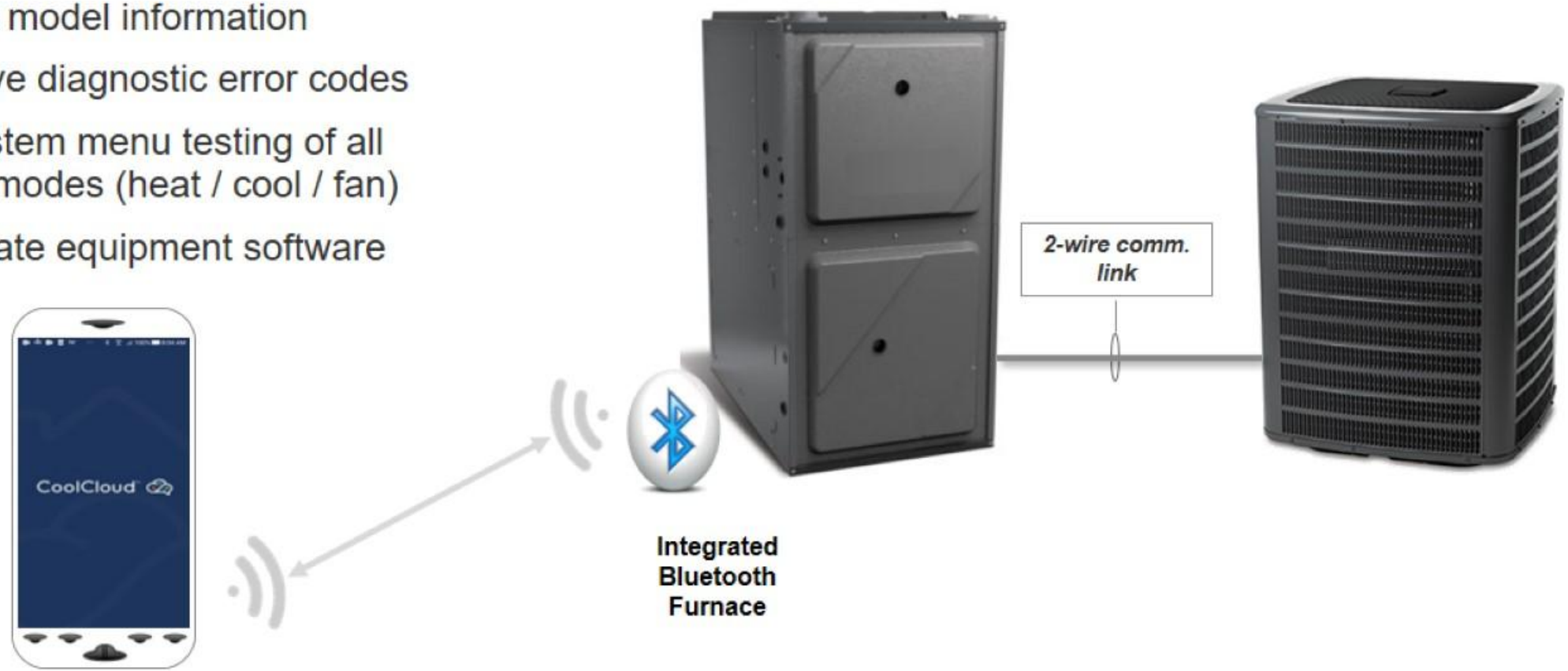
ComfortBridge™ technology

ComfortBridge™ Technology

- The **ComfortBridge™** technology smart home algorithm gathers HVAC system performance data and uses it to automatically make adjustments that may reduce the amount of energy used to heat or cool your home.
- HVAC equipment with **ComfortBridge™** technology features a communicating circuit board designed to work with many thermostats.
  - Single-stage thermostats
  - Smart home thermostats
- After installation and initial set up, the basic temperature functions of your thermostat or HVAC control system remain the same.

ComfortBridge™ Technology

- Bluetooth® ready and functions with the Cool Cloud HVAC phone application.
- Cool Cloud HVAC phone application can:
  - See specific model information
  - Review active diagnostic error codes
  - Observe system menu testing of all operational modes (heat / cool / fan)
  - Directly update equipment software



ComfortBridge™ Technology

96% 2-Stage ComfortBridge™ Furnaces

Upflow

*MVC960403B*BA

*MVC960603B*BA

*MVC960803B*BA

*MVC960804C*BA

*MVC961005C*BA

*MVC961005D*BA

*MVC961205D*BA

Counterflow

*CVC960403B*BA

*CVC960603B*BA

*CVC960804C*BA

*CVC961005C*BA

*CVC961205D*BA

ComfortBridge™ technology

ComfortBridge™ Technology

97% Modulating ComfortBridge™ Furnaces

Upflow

*MVM970603B*BA

*MVM970803B*BA

*MVM970804B*BA

*MVM971005C*BA

*MVM971205D*BA

Counterflow

*CVM970603B*BA

*CVM970803B*BA

*CVM970804B*BA

*CVM971005C*BA

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ComfortBridge™ Technology

80% 2-Stage ComfortBridge™ Furnaces

Upflow

*MVC80603B*CA

*MVC80604B*CA

*MVC80803B*CA

*MVC80804C*CA

*MVC80805C*CA

*MVC80805D*CA

*MVC81005C*CA

Counterflow

*CVC80603B*CA

*CVC80803B*CA

*CVC80805C*CA

*CVC801005C*CA

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ComfortBridge™ Technology

80% 2-Stage ComfortBridge™ Furnaces New Nomenclature

Upflow

*MVC800603B*AA

*MVC800604B*AA

*MVC800803B*AA

*MVC800804C*AA

*MVC800805C*AA

*MVC800805D*AA

*MVC801005C*AA

Counterflow

*CVC800603B*AA

*CVC800803B*AA

*CVC800805C*AA

*CVC801005C*AA

ComfortBridge™ technology

ComfortBridge™ Technology

ComfortBridge™ AVPTC Air Handlers

AVPTC25B14B*
AVPTC29B14B*
AVPTC31C14B*
AVPTC33C14B*
AVPTC35B14B*
AVPTC37B14B*
AVPTC37C14B*
AVPTC37D14B*
AVPTC39C14B*
AVPTC49C14B*
AVPTC49D14B*
AVPTC59C14B*
AVPTC59D14B*
AVPTC61D14B*

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ComfortBridge™ AVPEC Air Handlers

AVPEC25B14B*

AVPEC37C14B*

AVPEC59D14B*

AVPEC61D14B*

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ComfortBridge™ MBVC Air Handlers

MBVC1201AA-1

MBVC1601AA-1

MBVC2001AA-1

ComfortBridge™ Technology

ComfortBridge™ Furnaces | Optional Sensors

Optional supply and return air temperature sensors are available for Comfortbridge Furnaces which allow:

1. Users to view return and supply air temperatures using the CoolCloud application.
2. Users to view return and supply air temperature difference using the CoolCloud application.
3. Furnace to control equipment heating and cooling operations based on return air temperature trends.
   - Supply Air Sensor 0130F00933
   - Return Air Sensor 0130F00934

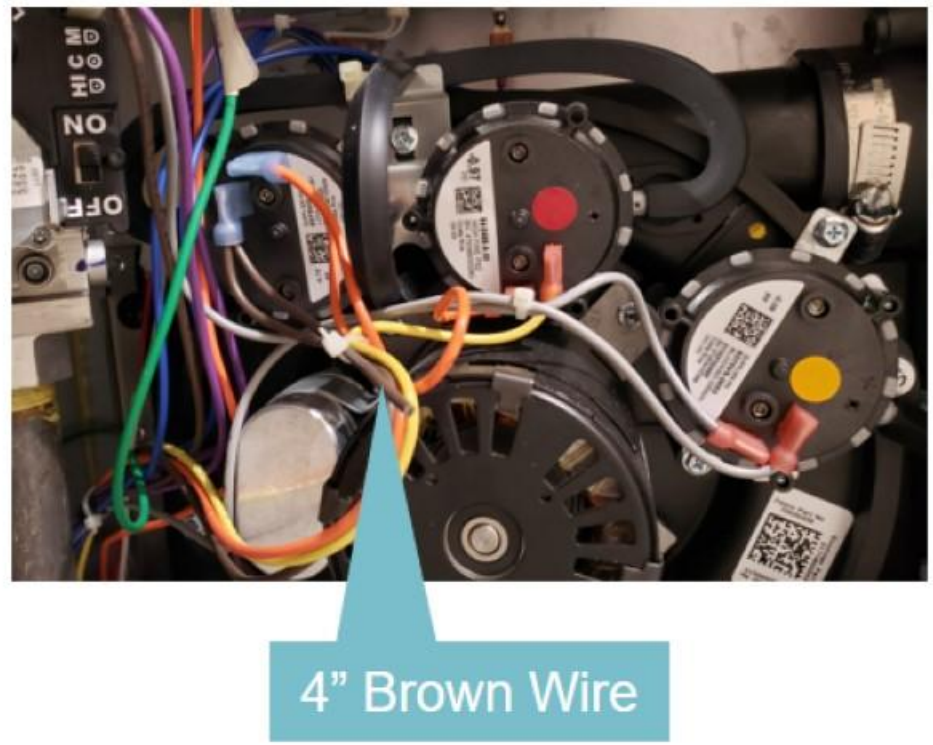
ComfortBridge furnaces utilizing control board PCBKF204 or PCBKF107 will require an OTA (Over The Air) software update via the CoolCloud application in order to support these external temperature sensors.

ComfortBridge™ Technology

ComfortBridge™ Furnaces | Humidification

- ComfortBridge™ 96% & 97% furnace models produced mid 2019 and later will have a 4” brown wire on the low fire pressure switch for a 24-volt humidifier connection.

CLEAN COMFORT
INDOOR AIR ESSENTIALS



ComfortBridge™ Technology

ComfortBridge™ | Electronic Air Cleaner

- Furnace integrated control module is equipped with a line-voltage accessory terminal for the electronic air cleaner.
  - Terminal EAC is 120 VAC and rated for 1.0 amps.
  - EAC energizes whenever the blower motor is active.
- Air handler circuit boards are equipped with two terminals for the electronic air cleaner.
  - Terminals EAC-in & EAC-out are connected to a set of relay contacts which are rated for 1.0 amp at 24 VAC.
  - EAC-in & EAC-out contacts close whenever the blower motor is active.

CLEAN COMFORT
INDOOR AIR ESSENTIALS

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ComfortBridge™ Technology

Clean Comfort™ Zoning

- Clean Comfort™ zoning consists of a residential & light commercial zone control panel.
- Models with an external static pressure sensor do not require a bypass damper when used with 3-wire power-open, power-close dampers.
- Accomplished via integrated static pressure sensor and control logic.
- Powered by dedicated 24VAC, 40VA transformer
- Capable of up to 6 zones
- Capable of accommodating single stage up to dual fuel (4 stage heat & 2 stage cool)

ComfortBridge™ Technology

Accessories - Zoning

- Because all indoor **ComfortBridge** models feature a 24 VAC low voltage connection bus, they can connect to any 24 VAC off-the-shelf forced air zoning control.
- The timing algorithm built into the **ComfortBridge** line of equipment continuously works to push the equipment operation to its lowest speed complimenting zoning operation.
- Currently you will need to utilize a bypass or dump zone to maintain error free zoning operation.
    - Remember zoning is designed for comfort not efficiency.

ComfortBridge™ Technology

Review

Where can you find information such as service and install manuals?

PartnerLink

What is required to determine if the indoor unit contains **ComfortBridge™** ?

Full Model Number

What form of communication does **ComfortBridge™** use with the **CoolCloud™** HVAC app?

Bluetooth®

What type of thermostat can be used with the **ComfortBridge** equipment?

Any single-stage or smart-home thermostat

Module 2

Installation

Learning Objectives

- Explain the control boards
- Explain the low voltage wiring requirements of installation

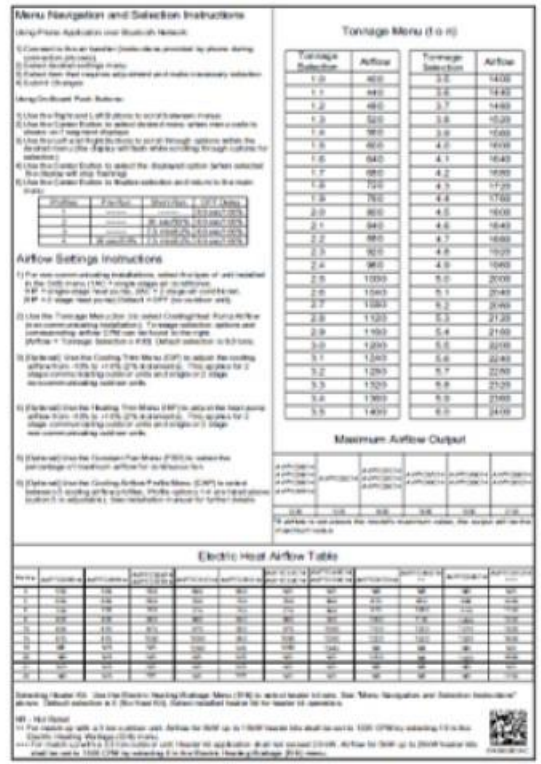
ComfortBridge™ technology

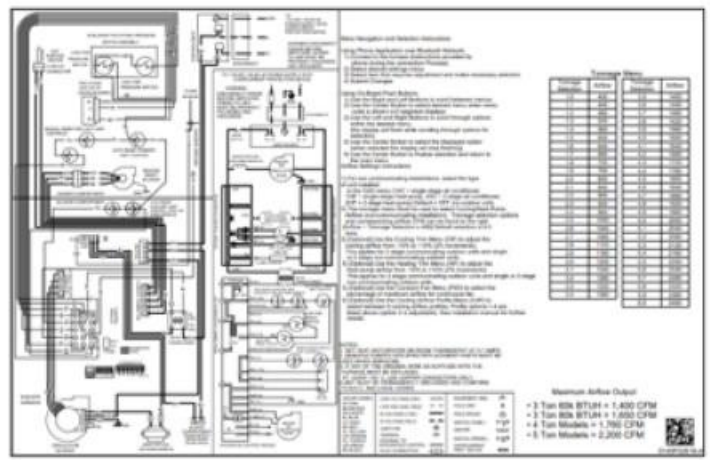
Installation

Indoor Equipment Door Labels

The door labels on ComfortBridge equipment contain a large amount of quick reference data including:

- Status menu codes
- Using the phone app over Bluetooth® network
- Using the onboard push buttons
- Airflow and tonnage setting instructions for non-communicating outdoor units
- Maximum airflow output
- Wiring diagrams
- Electric heat airflow tables
- Additional notes and cautions



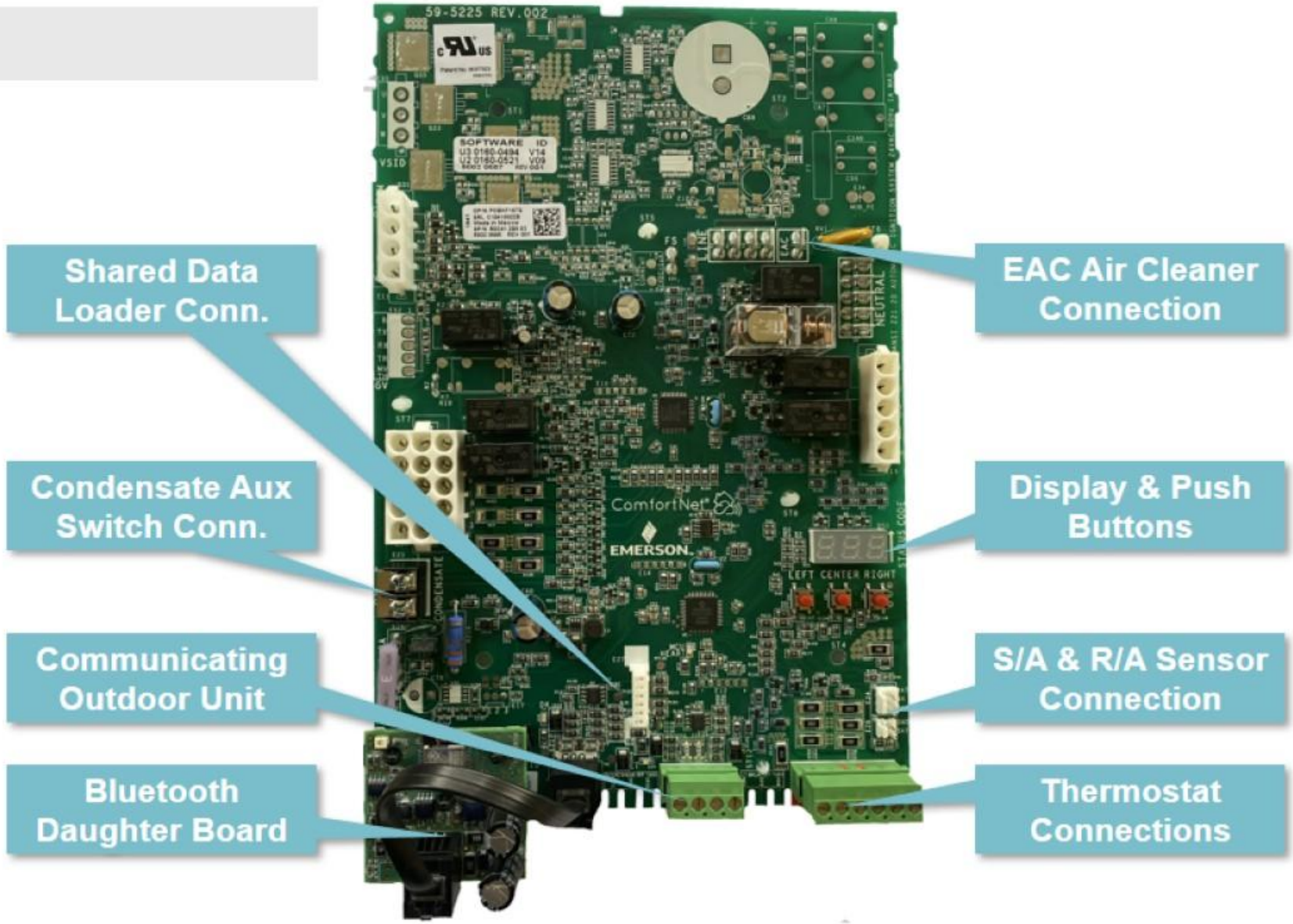


Installation

Control Board | PCBKF107

ComfortBridge Technology

- *MVC/*CVC96******BA furnaces
- *CVC8******CA furnaces
- *MVC/*CVC80******AA furnaces
- Can be used with the **CoolCloud** application
- Bluetooth® Ready with a Bluetooth daughter board



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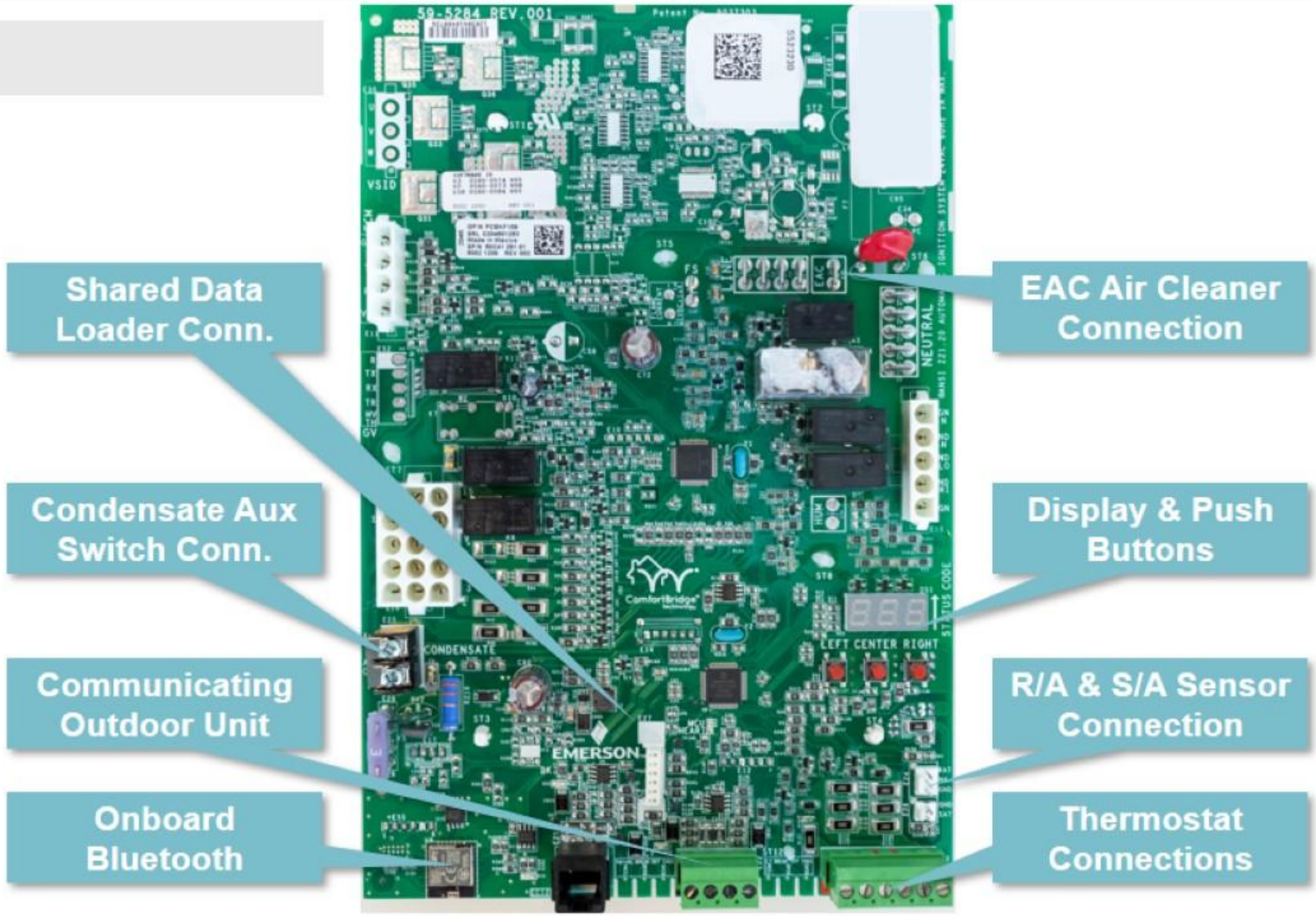
Installation

Control Board | PCBKF109

ComfortBridge Technology

- *MVC/*CVC96******BB furnaces
- *MVC/*CVC80******AC furnaces
- Can be used with the **CoolCloud** application
- Bluetooth® Ready with onboard Bluetooth



Installation

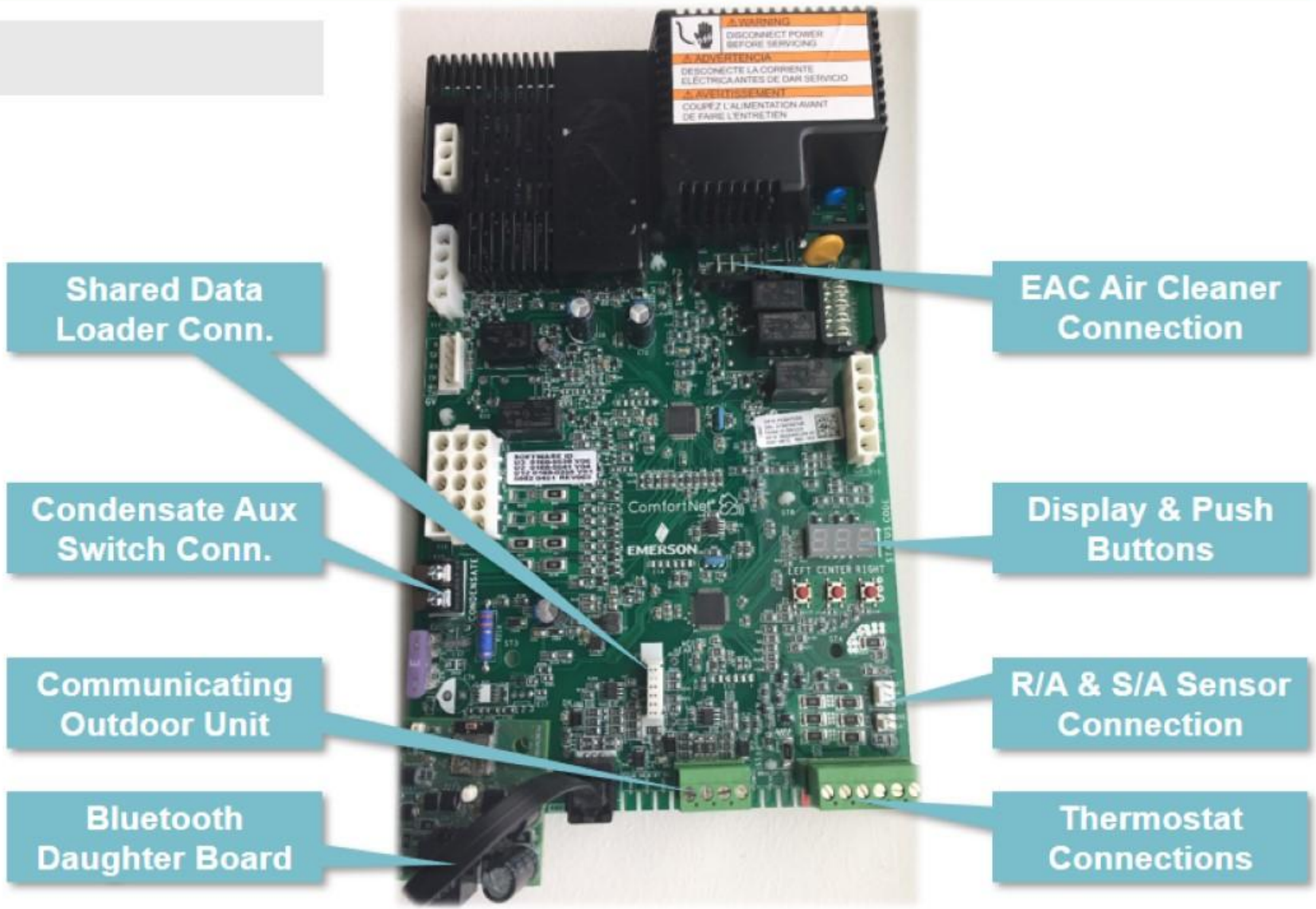
Control Board | PCBKF204

ComfortBridge Technology

- *MVM/*CVM97******BA furnaces
- Can be used with the **CoolCloud** application
- Bluetooth® Ready with a Bluetooth daughter board

Variable Frequency Drive

- Board uses a “variable frequency drive” to control the speed of the inducer motor



ComfortBridge™ technology

Installation

Control Board | PCBCM100

- Bluetooth® daughter board connected via RJ12 Cable used on:
  - PCBKF106
  - PCBKF107
  - PCBKF204
  - Other boards have Bluetooth® feature built in

Bluetooth® Board

Part # PCBCM100

RJ12 Cable

Part # 0159F00083

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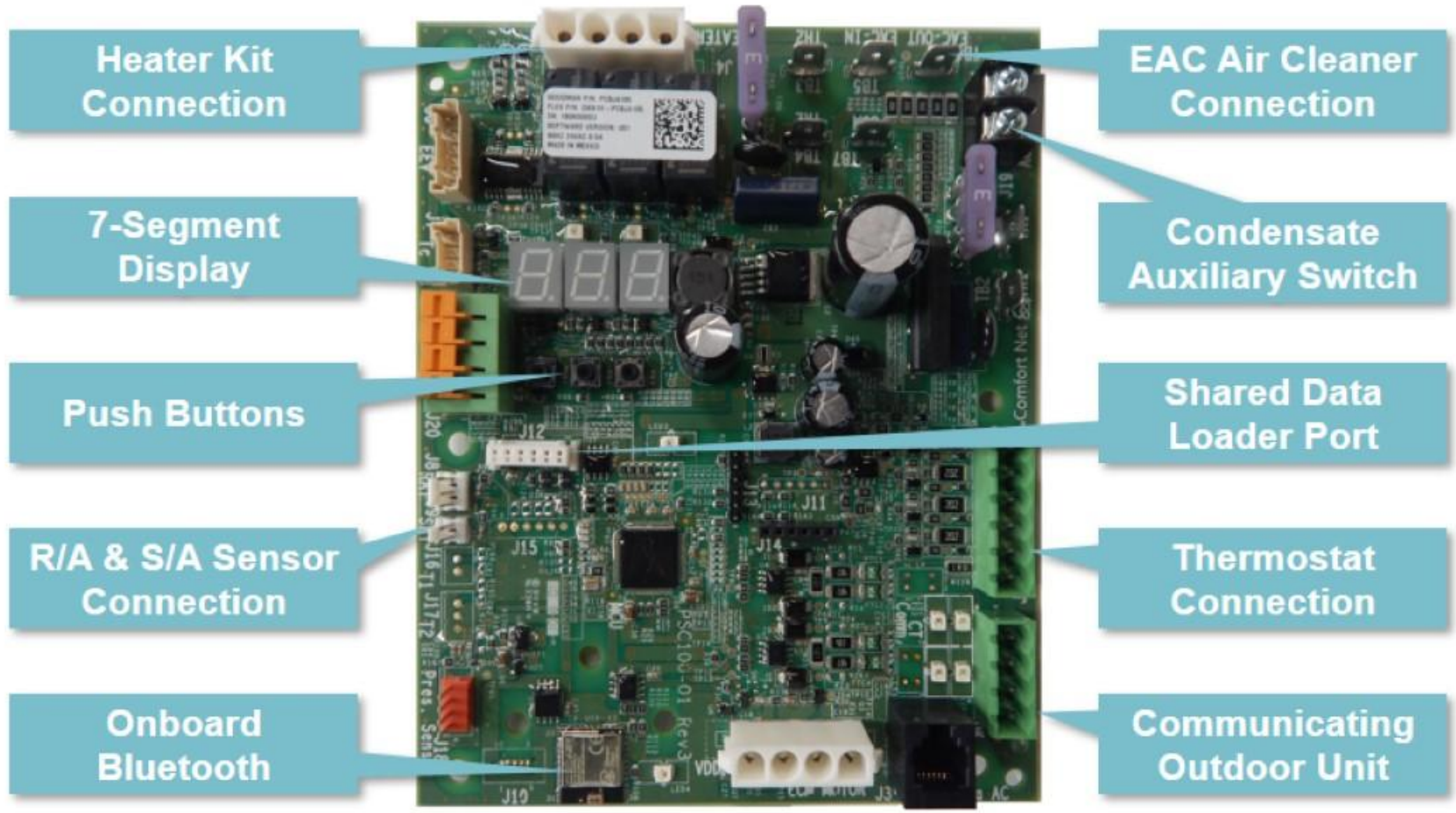
Installation

Control Board | PCBJA105

ComfortBridge Technology

- AVPTC & AVPEC BA Revisions
- Can be used with the **CoolCloud** application
- Bluetooth® Ready with onboard Bluetooth
- Connection for Shared Data Loader



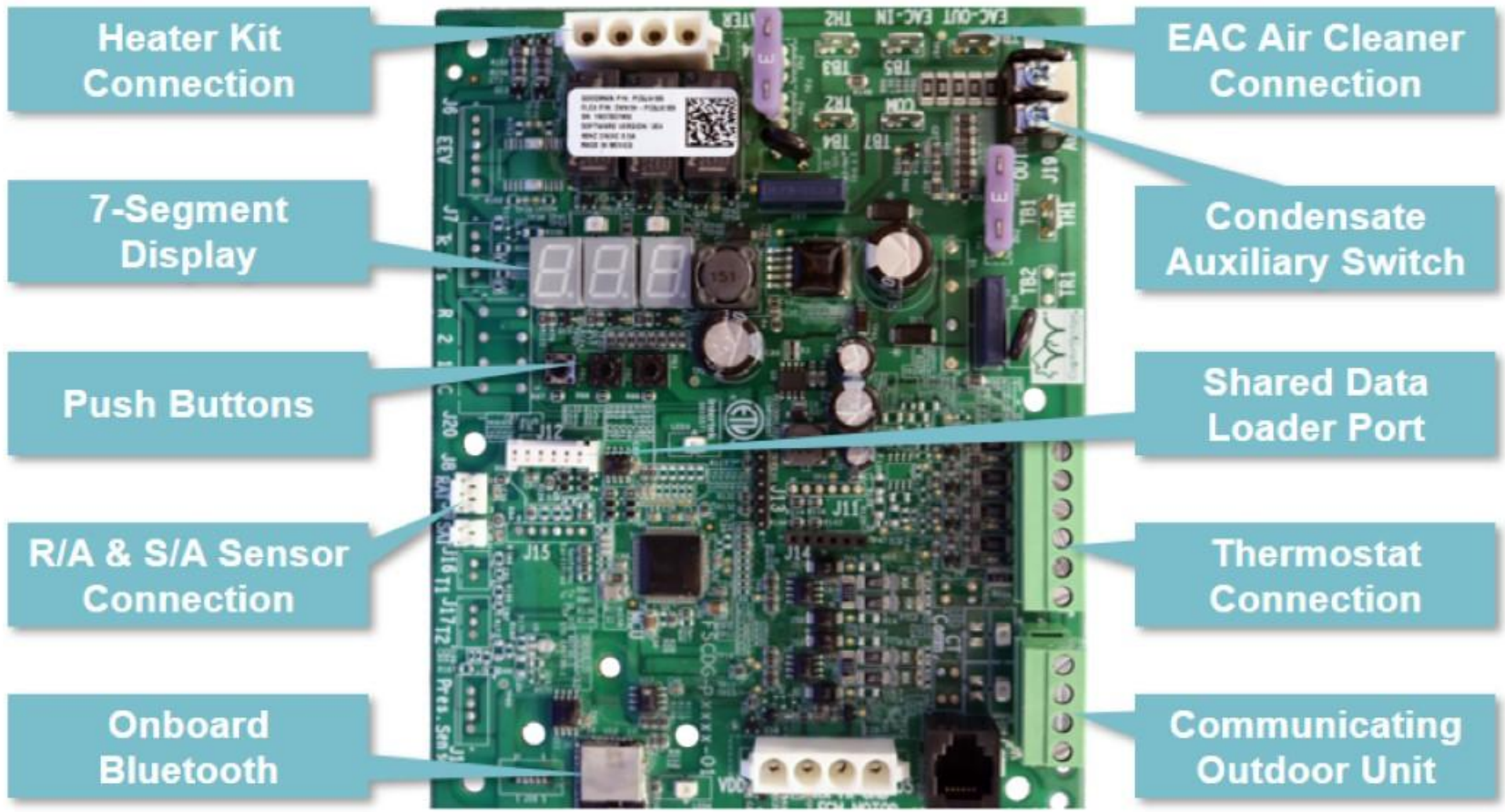
ComfortBridge™ technology

Installation

Control Board | PCBJA106

ComfortBridge Technology

- AVPTC & AVPEC BA Revisions
- Can be used with the **CoolCloud** application
- Bluetooth® Ready with onboard Bluetooth
- Connection for Shared Data Loader



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Installation

Phoenix Plug | Part Numbers

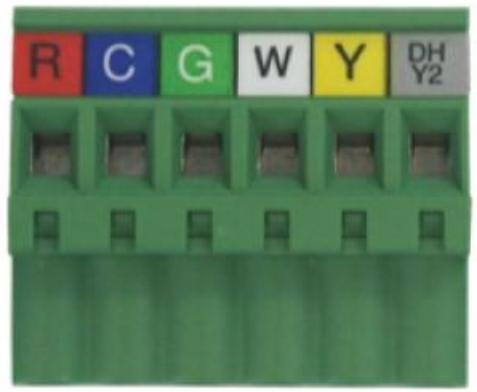
ComfortBridge Models have Phoenix plugs which can be removed from the board for connecting low voltage wiring

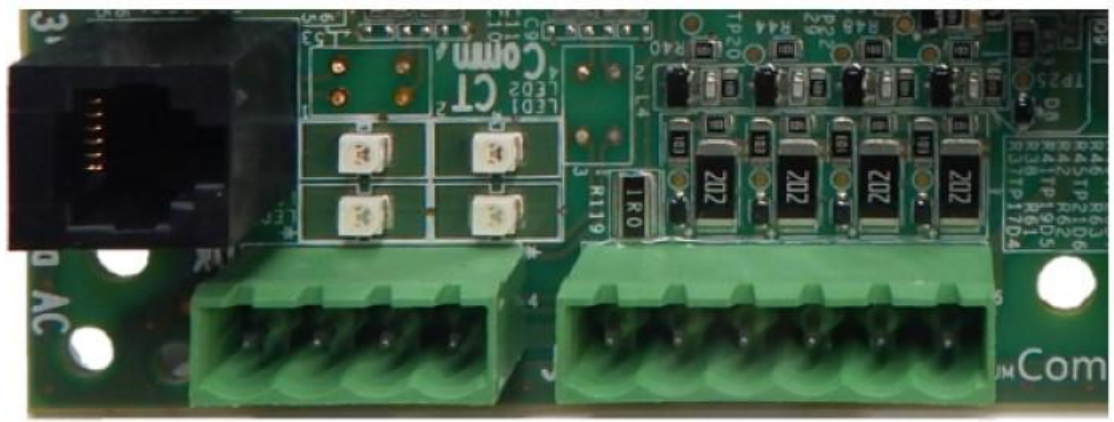
- 4-pin Communicating Outdoor Unit Connector

  (Part # F043067900S)

- 6-pin Thermostat Connector

  (Part # F043080600S)





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Installation

Thermostat | ComfortBridge System Requirements

- Functions with any single-stage 24VAC thermostat
  - Heating only
  - Cooling only
  - Heating and Cooling
- Even if a heat pump is installed, the thermostat should be setup for conventional single stage operation.
  - Using a heat pump thermostat or setting the thermostat for multi-stage operation will result in incorrect performance.
  - This communicating system does not contain an ‘O’ wire input (reversing valve signal).

Installation

Thermostat | ComfortBridge Algorithm

- Thermostat must only provide a single stage call
- ComfortBridge algorithms will control;
  - Indoor blower speed
  - Staging on two stage units
  - Capacity on modulating furnaces
  - Capacity on inverter air conditioners or heat pumps
  - Heat pump reversing valve operation

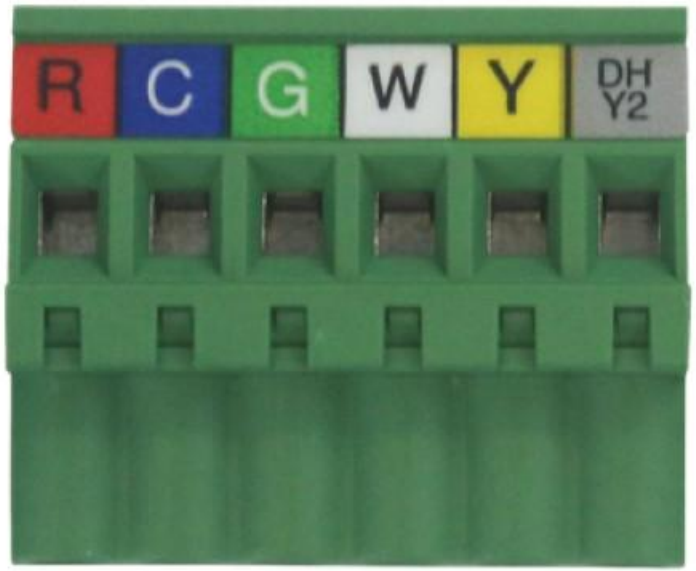
ComfortBridge™ technology

Installation

Thermostat Connections | ComfortBridge Indoor Unit

6-pin thermostat connector on the control board has the following thermostat connections

- R – 24VAC hot
- C – 24VAC common
- G – Indoor fan calls
- W – Heating calls
- Y – Cooling calls
- DH/Y2 – Used as DH or Y2
  - DH – Dehumidification – Reduces indoor blower CFM by 15%
    - Communicating outdoor units
    - Non-communicating single-stage outdoor unit
  - Y2 – Second Stage Compressor
    - Non-Communicating two-stage outdoor units



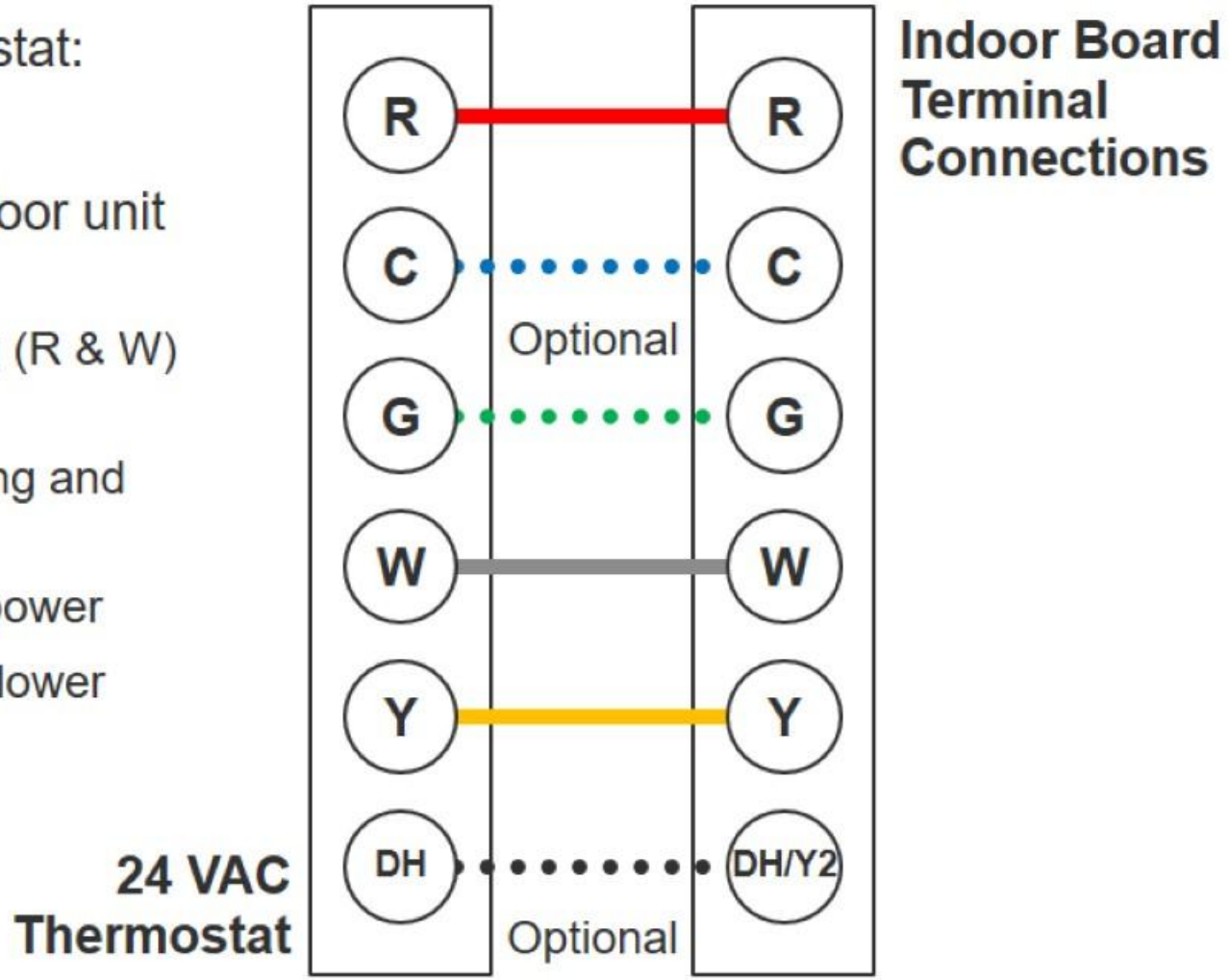
6-pin Connector

Installation

Thermostat Wiring | ComfortBridge Indoor Unit

Wiring ComfortBridge indoor unit to thermostat:

- Minimum 18 AWG thermostat wire
- Maximum of 150 feet of wire between indoor unit and thermostat
  - Two thermostat wires required for heating (R & W) or cooling (R & Y) only systems.
  - Three thermostat wires required for heating and cooling systems (R, W, and Y).
  - C is only required if the thermostat uses power
  - G is only required for continuous indoor blower
  - DH is only required for dehumidification

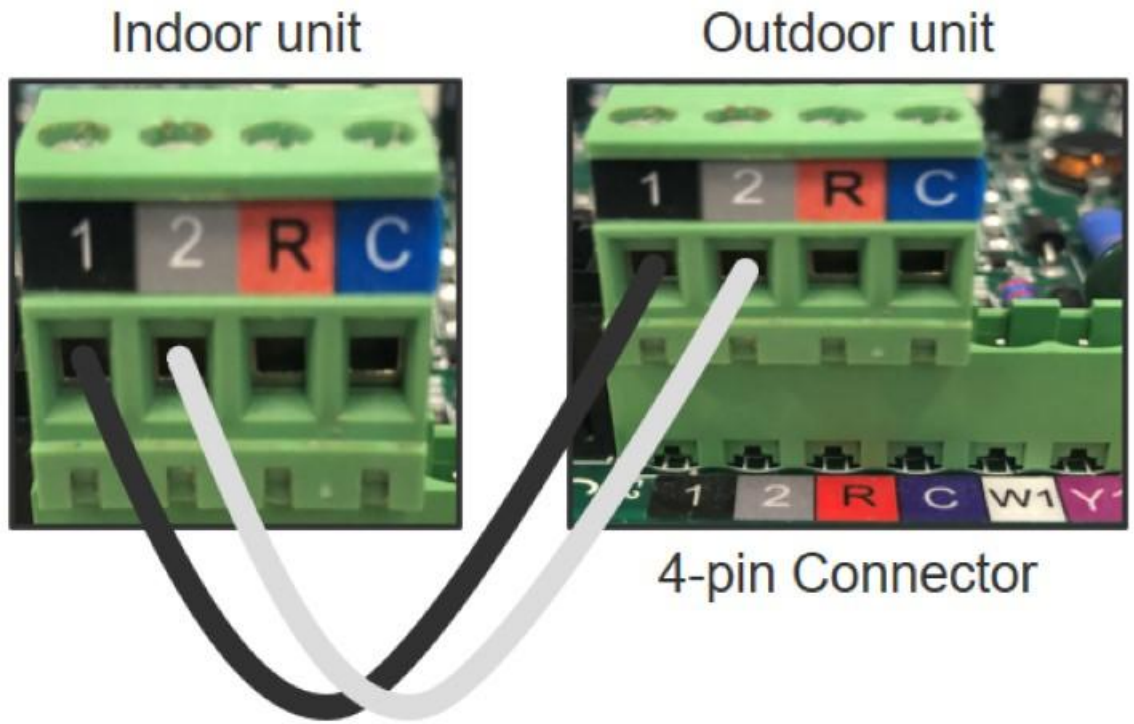


Installation

Data Wiring | Communicating Outdoor Unit

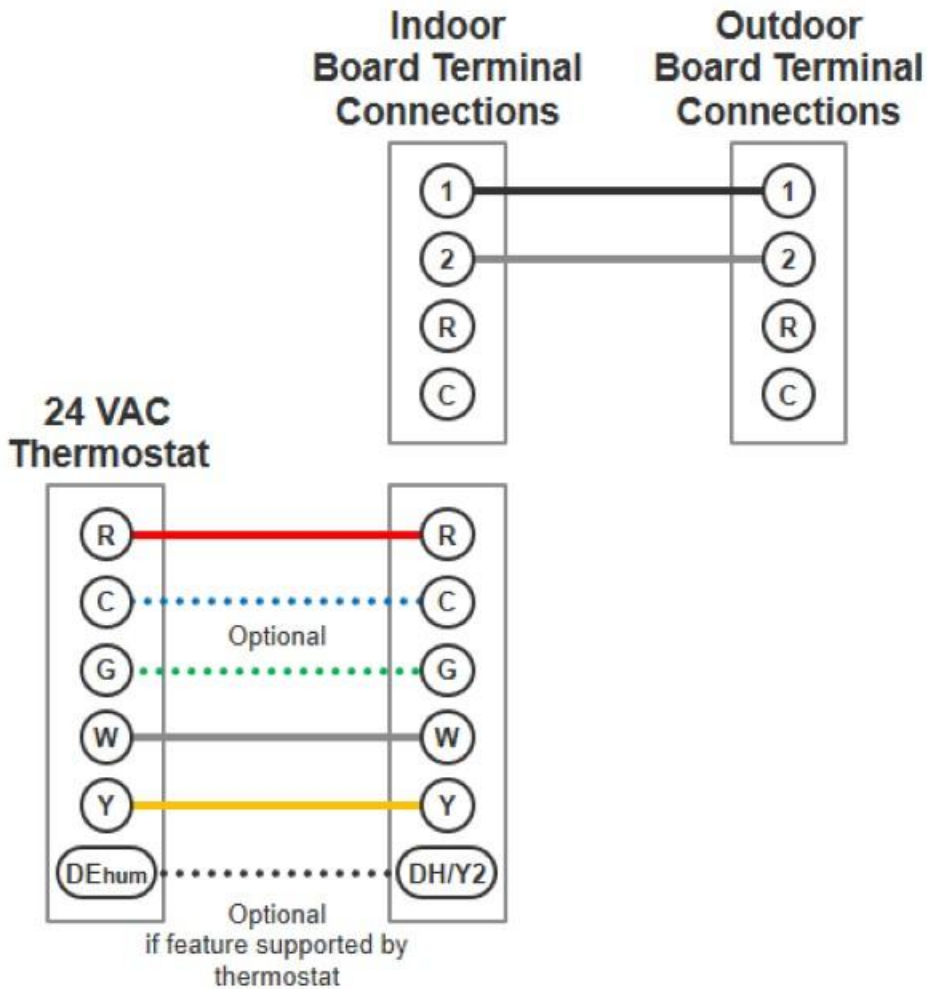
Wiring data wires 1 & 2 between the indoor and outdoor unit

- Polarity of wiring must be maintained
- Shielded cable is not required
- Minimum 18 AWG thermostat wire
- Maximum of 150 feet of wire between indoor and outdoor units



Installation

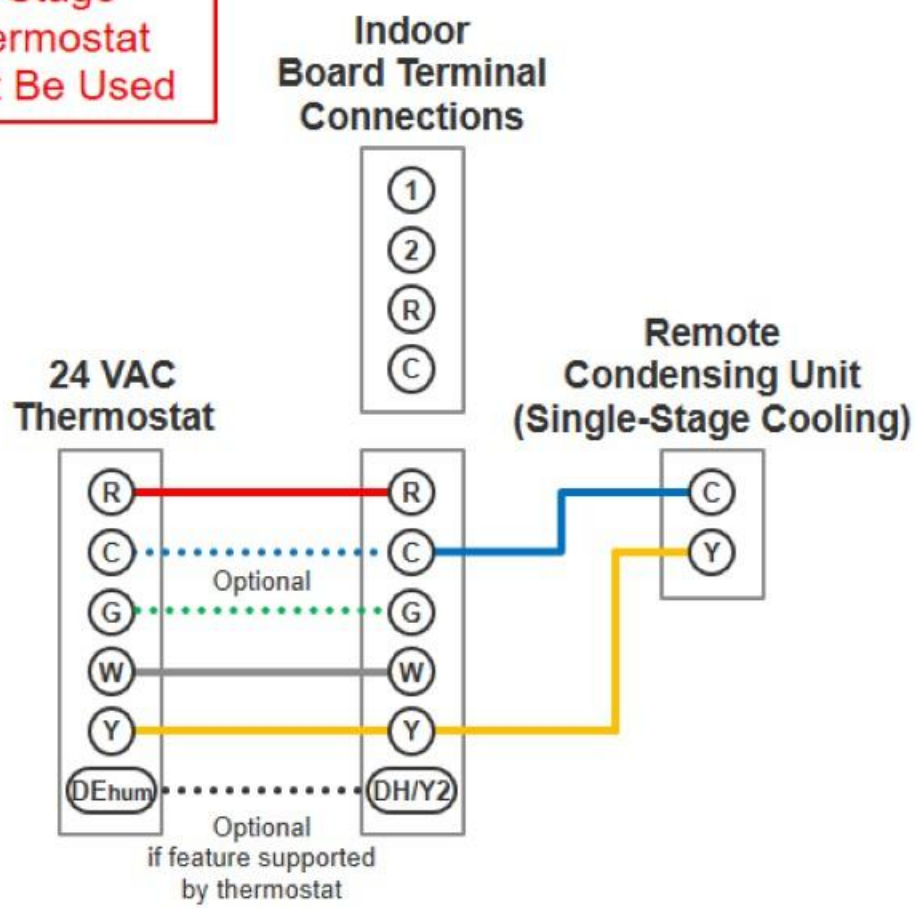
Low Voltage Wiring | Communicating Air Conditioner Or Heat Pump



Installation

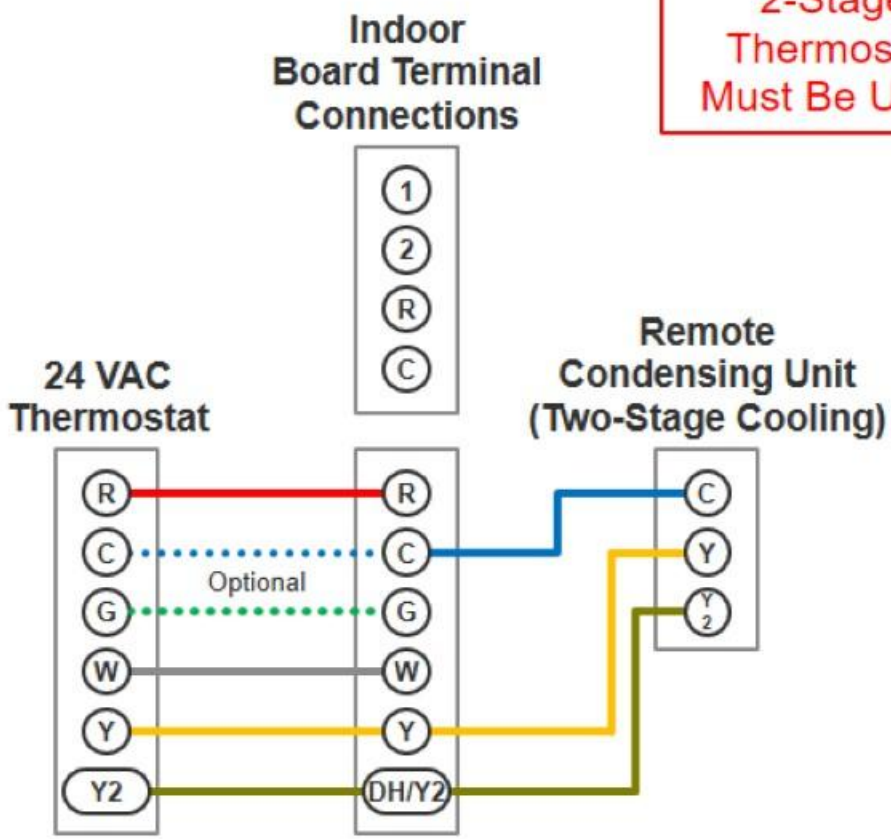
Non-Communicating 1-Stage A/C

1-Stage Thermostat Must Be Used



Non-Communicating 2-Stage A/C

2-Stage Thermostat Must Be Used



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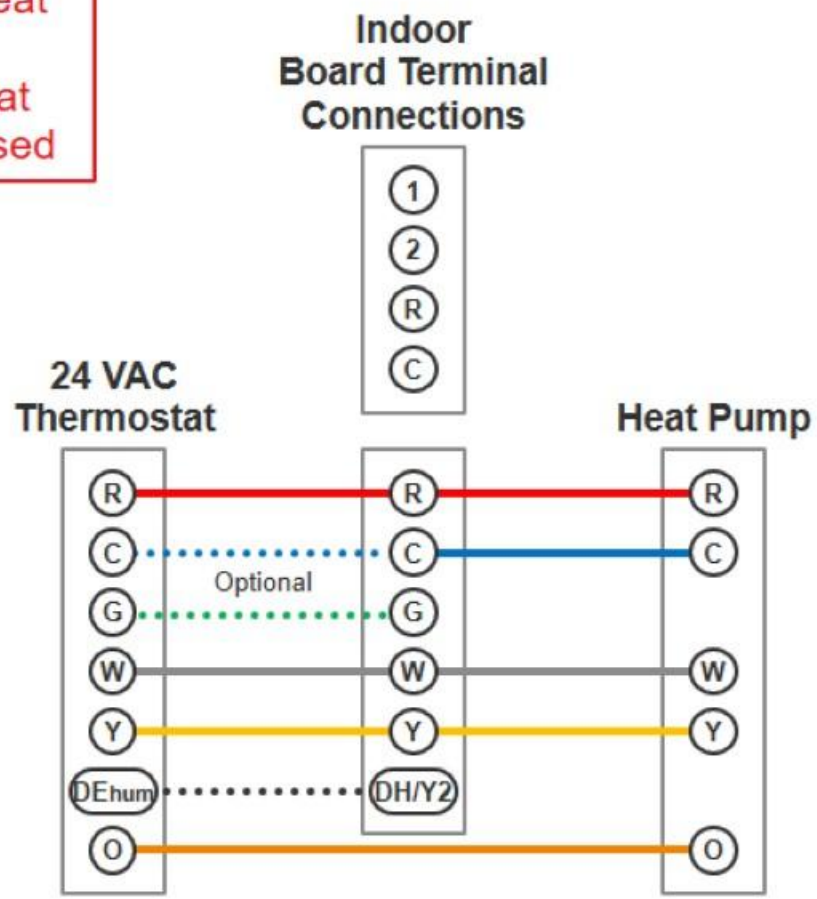
Installation

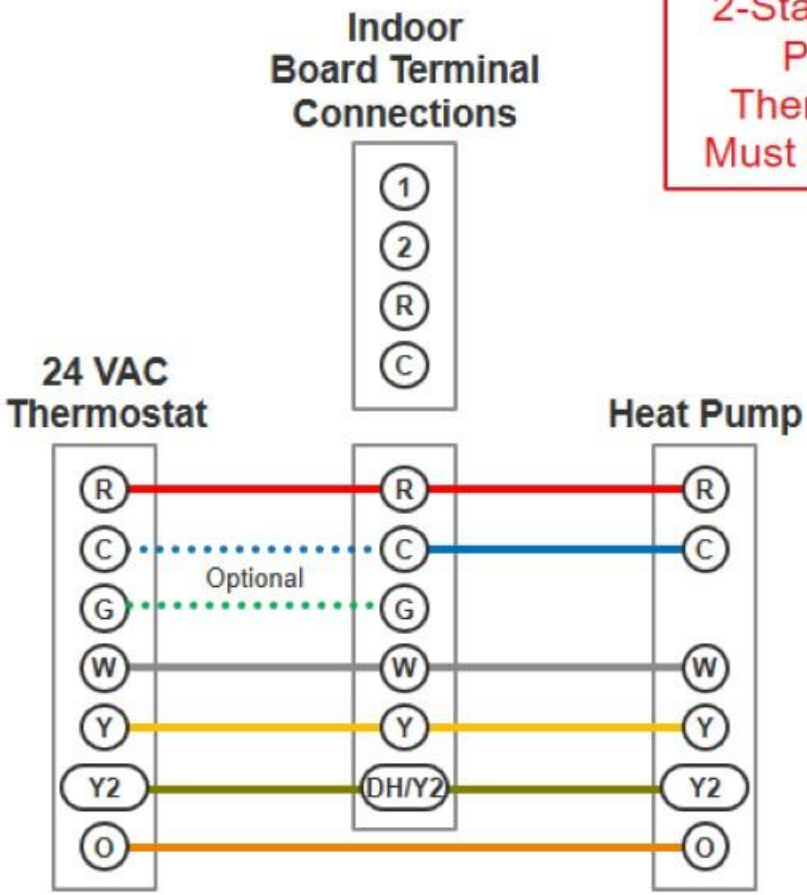
Non-Communicating 1-Stage Heat Pump

1-Stage Heat Pump Thermostat Must Be Used



Non-Communicating 2-Stage Heat Pump

2-Stage Heat Pump Thermostat Must Be Used



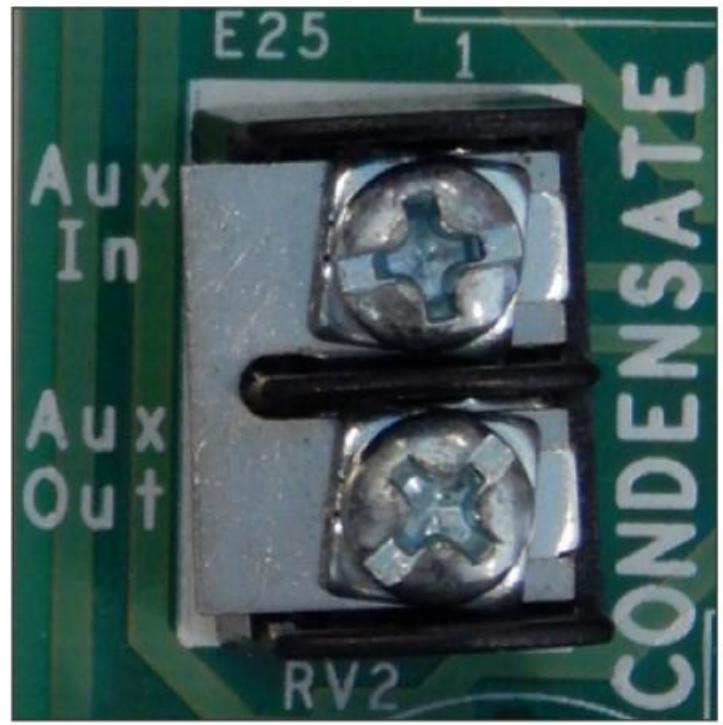
ComfortBridge™ technology

Installation

Condensate Alarm | Communicating Outdoor Unit

Unit is equipped with a 24VAC auxiliary alarm connection that is intended for use with a normally closed condensate switch.

- If a high-water condition causes the switch to open:
  - Control will respond by turning off:
    - Furnace
    - Communicating outdoor A/C
  - Only blower operation will be permitted
  - *EEF* will appear on the seven-segment display
- Once the AUX switch is detected closed for 30 seconds:
  - Normal operation resumes
  - *EEF* error message is no longer displayed



Non-Communicating outdoor units require that the condensate switch is wired to break the “Y” circuit.

Installation

Review

The 24VAC common wire be must be connected to thermostats that use _____.

Power

What is the minimum wire gauge allowed for low voltage wiring?

18 AWG

If a Non-Communicating heat pump is installed, what type of thermostat is required?

Heat Pump Thermostat

When can the AUX terminals be connected to a condensate switch?

When it is a communicating system

Module 3

CoolCloud™ HVAC App

Learning Objectives

- Explain how to set up the **CoolCloud** HVAC App
- Describe the process of connecting to equipment
- Explain how to update the equipment using the **CoolCloud** HVAC App

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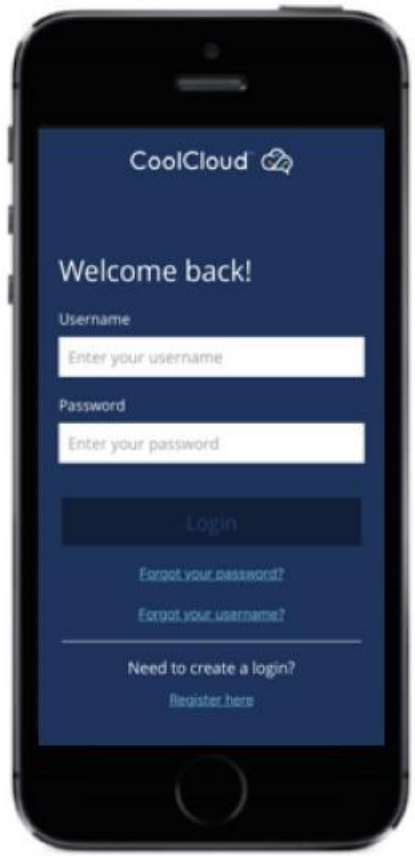
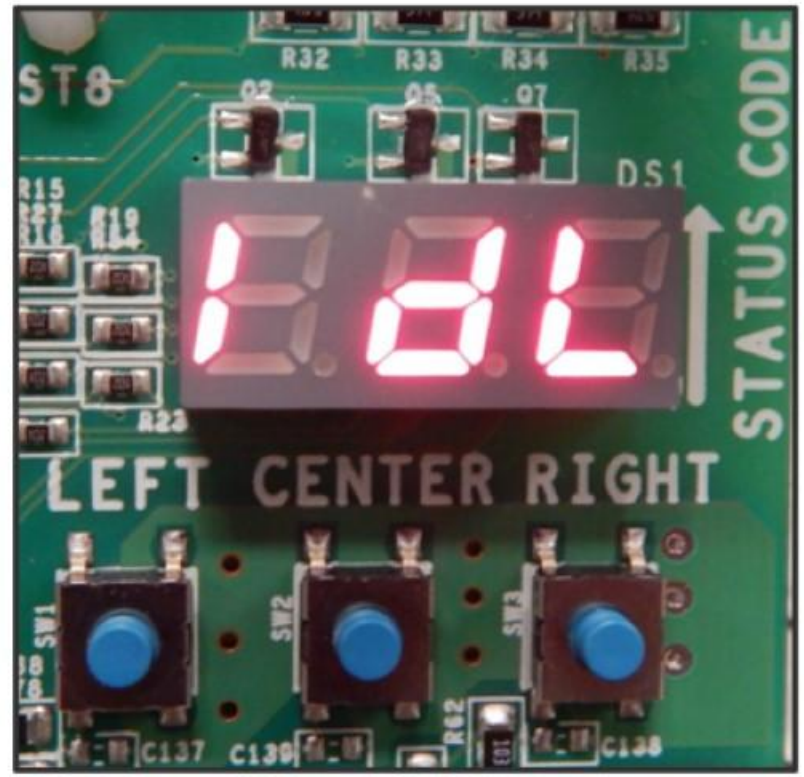
CoolCloud™ HVAC App

CoolCloud™ HVAC Application



7-Segment Displays And Push Buttons



CoolCloud™ HVAC App

Purpose Of The Application

- Designed to assist installers and technicians with start-up and troubleshooting
- Used to adjust settings and test operations of indoor and outdoor communicating units

CoolCloud™

- Cannot be used to test non-communicating outdoor units

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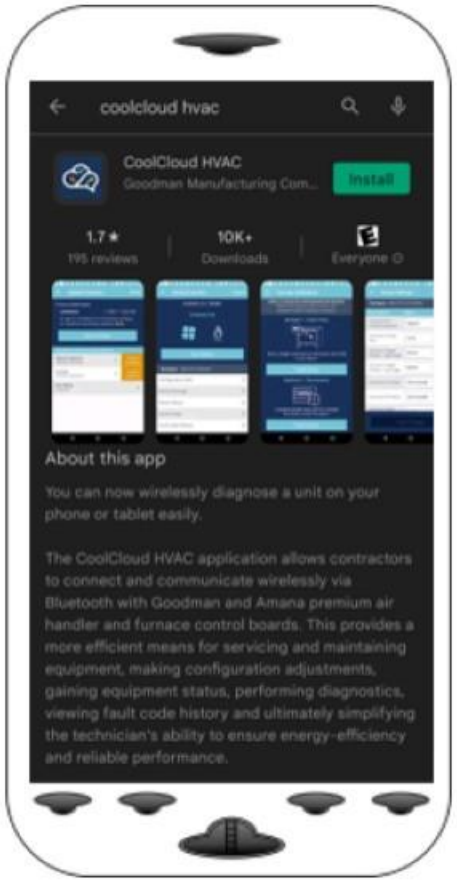
CoolCloud™ HVAC App

Download The CoolCloud™ HVAC Application

- Where can I download the app?

Download on the App Store

ANDROID APP ON Google play



- The **CoolCloud**™ HVAC app is available in **Apple**® and **Android**™ versions.

ComfortBridge™ technology

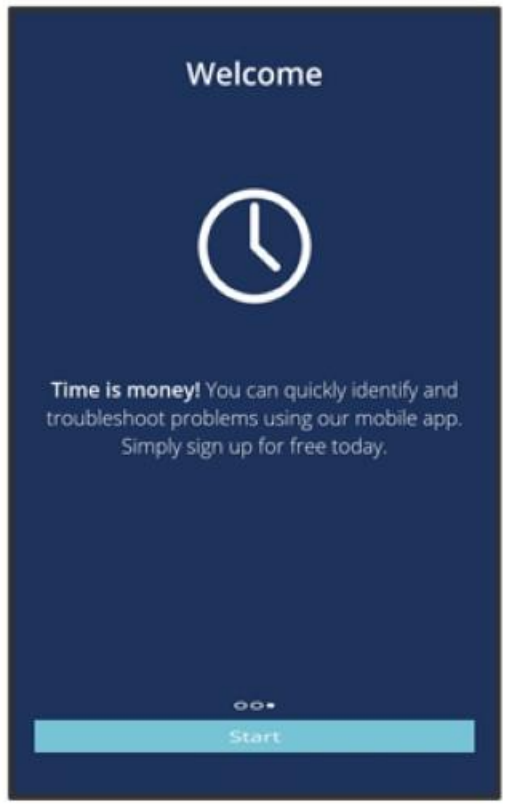
CoolCloud™ HVAC App

Welcome Screens

Bluetooth® Technology

Historical Data

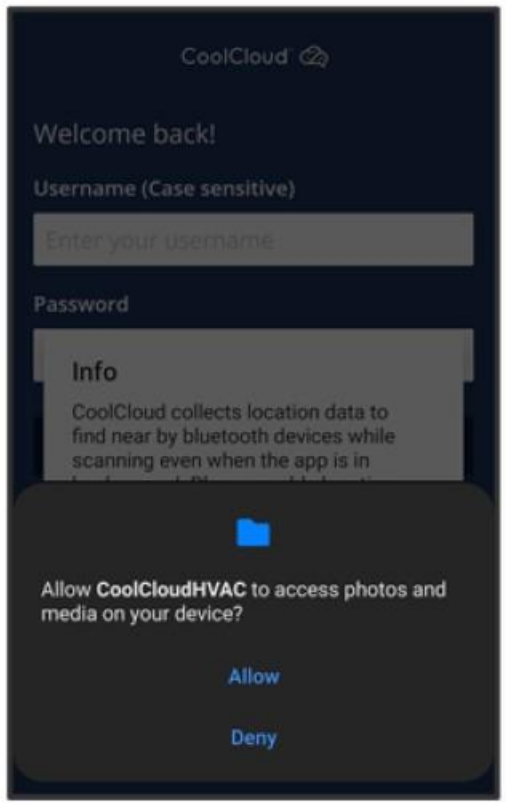
Time Is Money



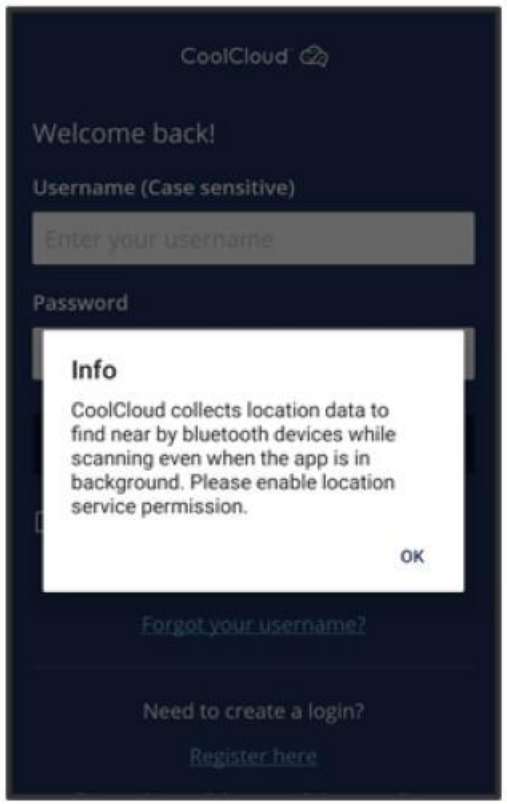
CoolCloud™ HVAC App

Permissions Required By Application

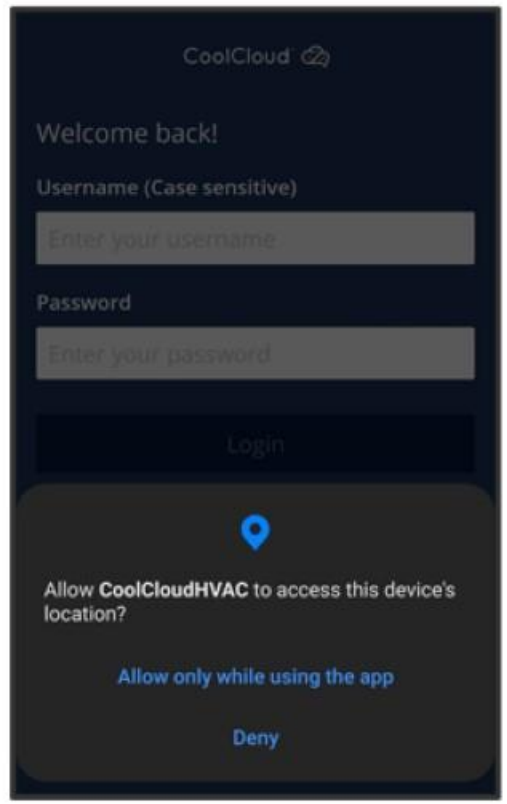
Access To Photos



Bluetooth Scanning



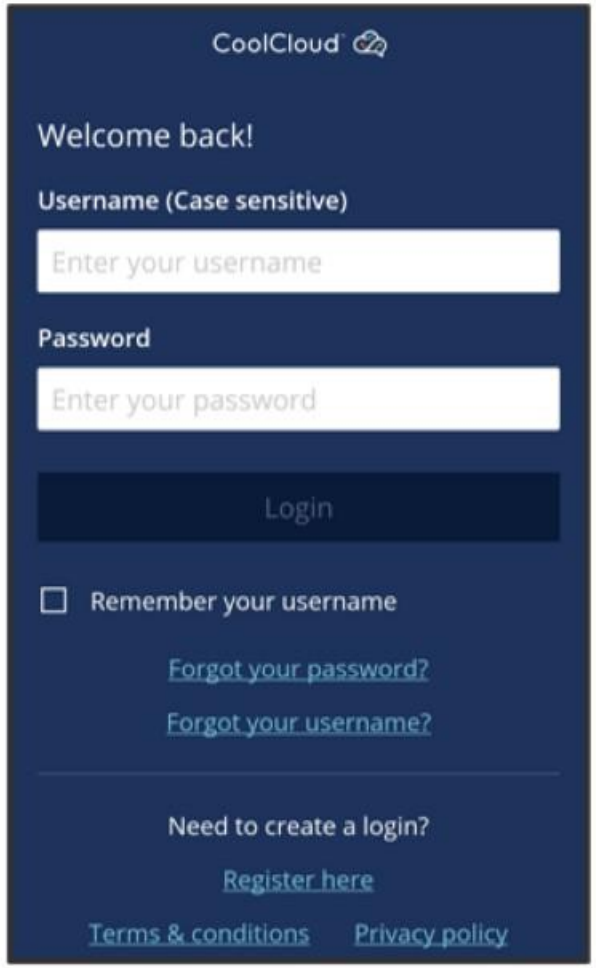
Device Location

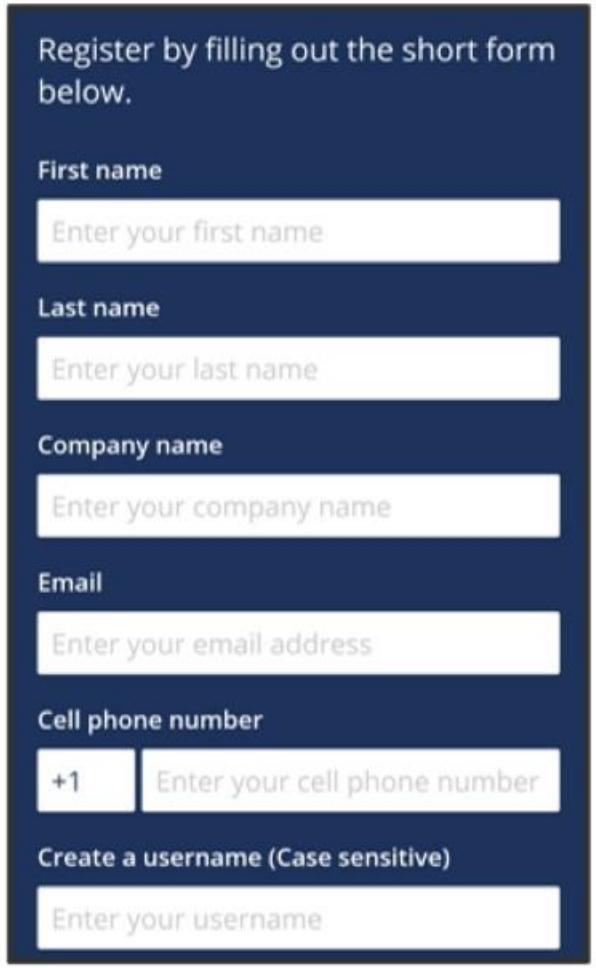


CoolCloud™ HVAC App

Login And Registration Screens

- Log in where you have a strong cell signal or are on an available Wi-Fi network.
- Create an account to get started.
- New users will first have to register for an account by providing registration information.
  - **Note:** Username information cannot be edited once selected by the user.
- If a user would like to make changes to the account information a new account will need to be created.



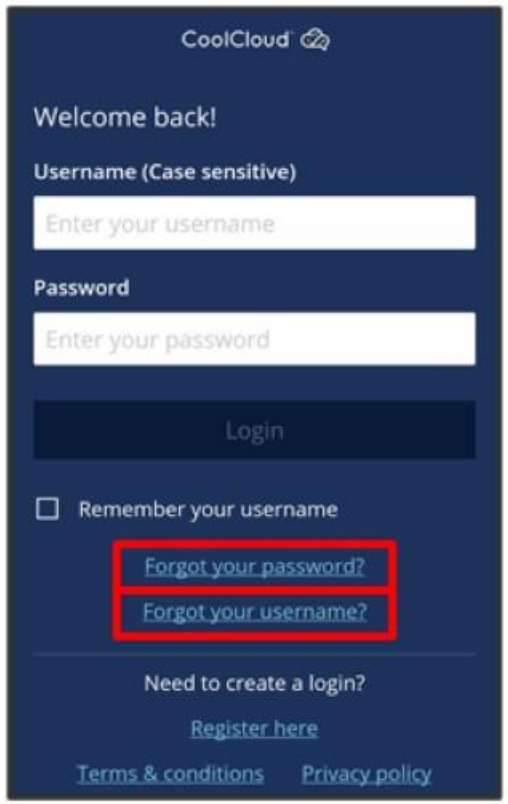


ComfortBridge™ technology

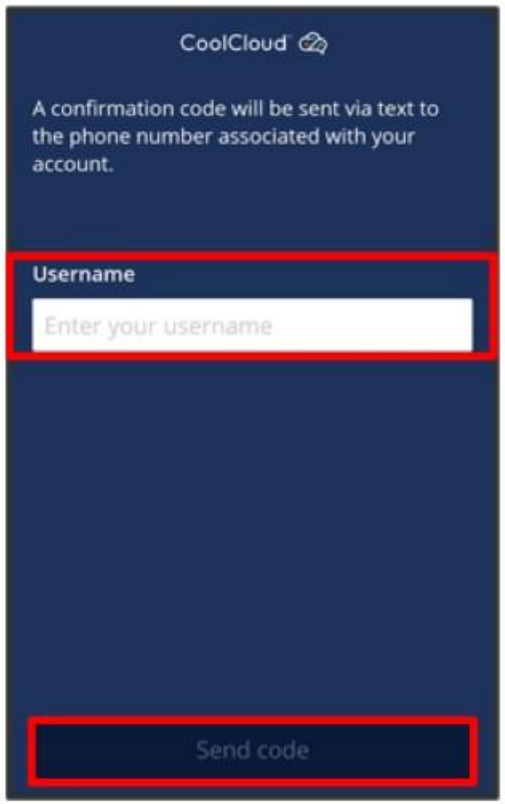
CoolCloud™ HVAC App

Forgot Username Or Password

Select Forgot Username Or Forgot Password



Enter Username Press Send Code



Enter Phone Number Press Send Username

CoolCloud™ HVAC App

Connecting to Equipment

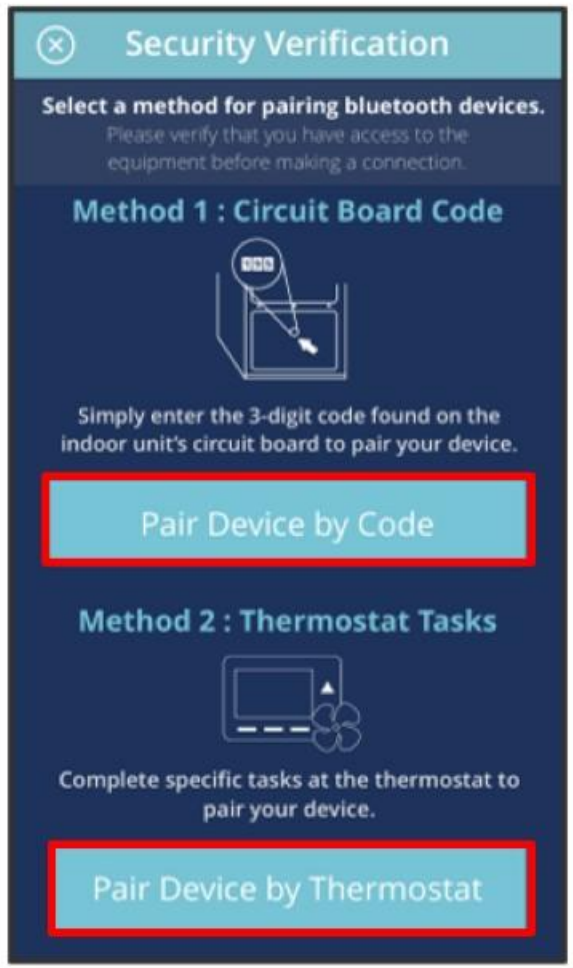
- Move to proximity of the equipment, boot up the app and the indoor equipment should appear on the device screen.
- Random **Bluetooth**® equipment in range may also appear and can simply be ignored.
- If the equipment being searched for does not appear choose *Refresh* in the upper right.
- A unit may not show up if:
  - It is out of **Bluetooth** range
  - Another user is connected to the same **Bluetooth** device
  - The unit is not powered on
- Tap the desired equipment to begin the connection steps.
- Pressing *Logout* returned the user to the previous log in screen.

CoolCloud™ HVAC App

Pairing Methods

Two methods are provided for security verification

1. **Pair Device by Code**
   - Allows the user to enter the three-digit code from the circuit board's three 7-segment displays.
2. **Pair Device by Thermostat**
   - This requires the user to complete simple tasks with the thermostat.
   - Can be very useful if the indoor equipment is in an undesirable area and the user wants to obtain information without going into a hot attic or cold crawl space.
   - If power must be removed, or obtaining the code requires the elimination of active diagnostic codes, *Pairing the Device by Thermostat* method may be more desirable.



CoolCloud™ HVAC App

Pairing To Indoor Equipment Using Circuit Board Code

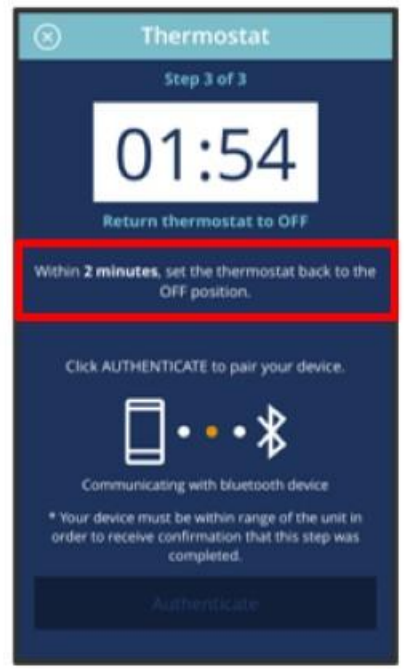
- You will be prompted for a 3-digit access code shown on the three seven segment displays.

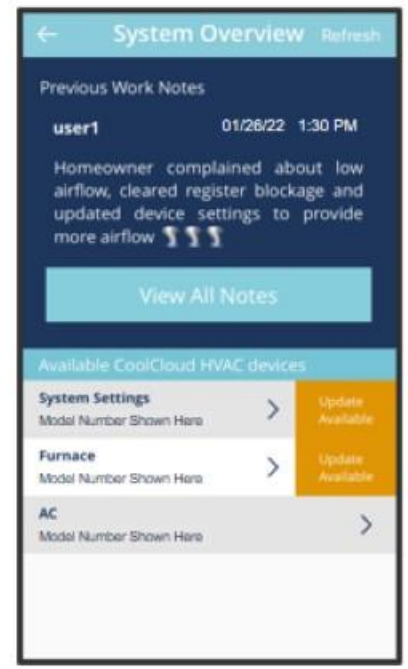
- If the code is visible, it can be entered in the Code Entry screen shown on the right.

CoolCloud™ HVAC App

Pairing To Indoor Equipment Using Thermostat Tasks

- Perform thermostat task as instructed by the application.
- The user will be notified when each step has been completed and instructed on what to do next.
- Once successful, the user will see a Success! Indicator and be moved to the main equipment screen.





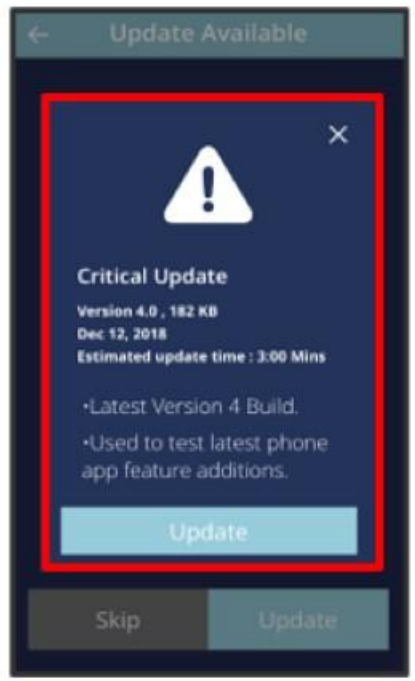
Note: Using the fan for verification eliminates thermostat heating/cooling time delays.

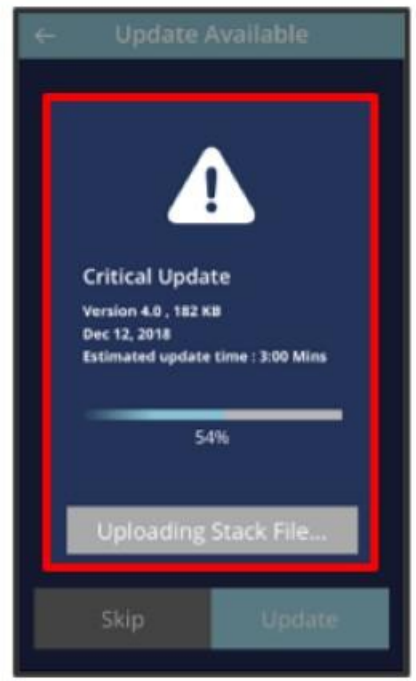
ComfortBridge™ technology

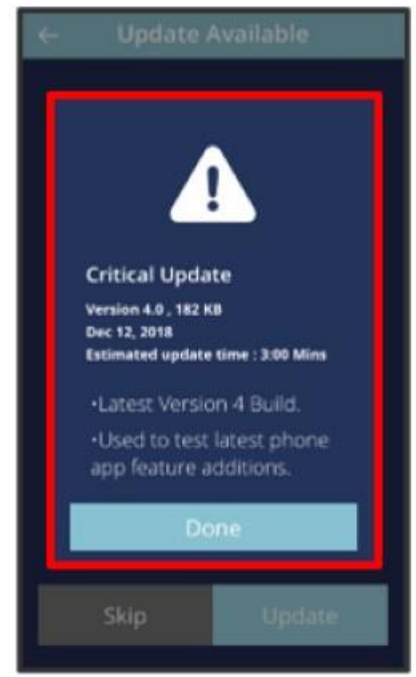
CoolCloud™ HVAC App

Software Updates

- Once paired, available software updates will be displayed.
- Mandatory updates are required before moving forward.
- Optional updates can be downloaded or skipped.





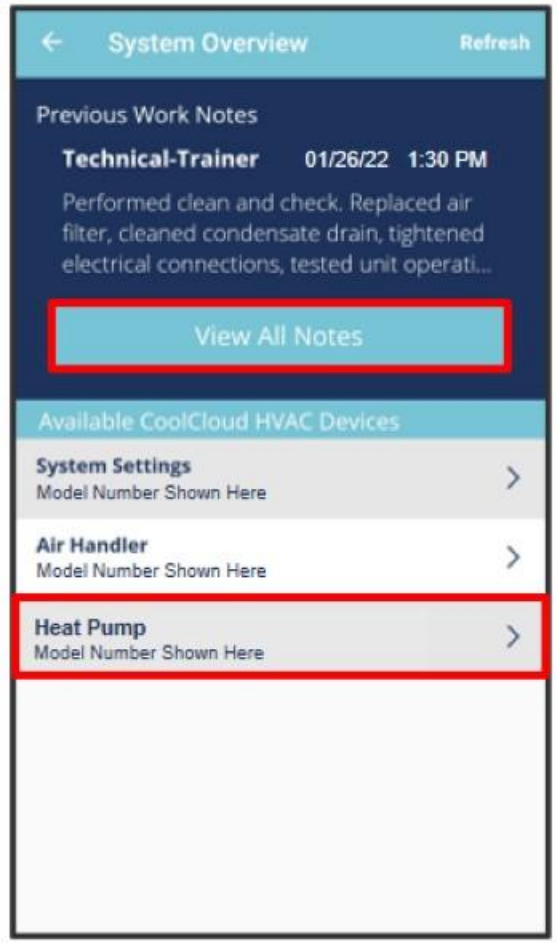


CoolCloud™ HVAC App

System Overview Screen

System Overview Screen appears once updates have been completed or skipped and will allow selection of:

- Work Notes
  - Selecting View All Notes allows you to view and add notes
    - Notes are stored in the control board
    - Important: Notes cannot be deleted or changed after entry
- Available CoolCloud devices
  - Communicating outdoor units will appear on this list as an AC or Heat Pump with the model number displayed.
  - Non-communicating outdoor units will have an unknown model number.
  - Indoor units that have not been set up to use a non-communicating outdoor unit will have Click To Set Up Non-Comm displayed.

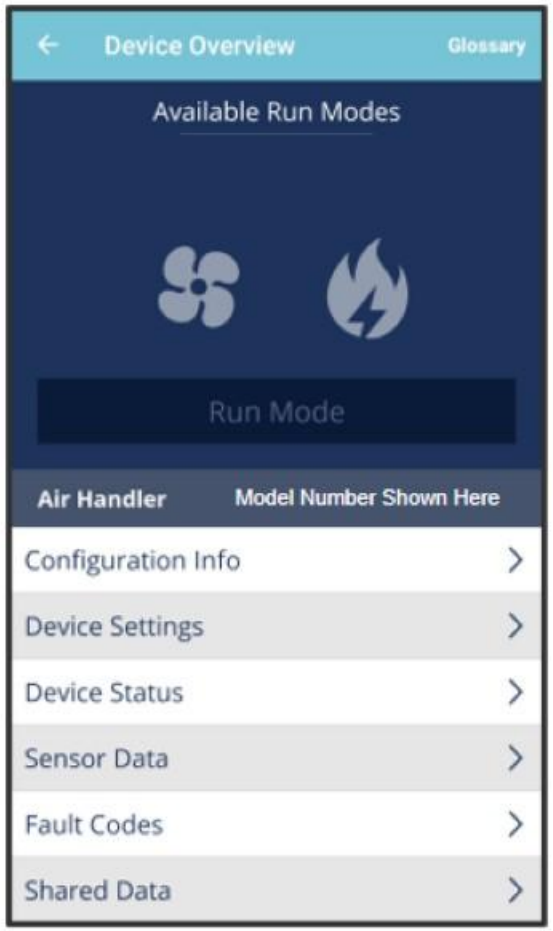


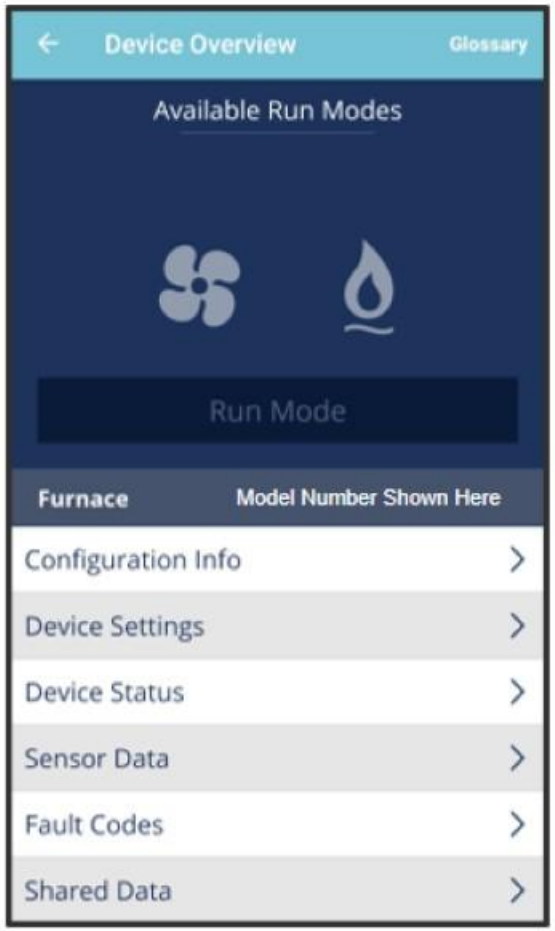
CoolCloud™ HVAC App

Device Overview Screen

User can:

- View Glossary
- Run Equipment Tests
- View Configuration Information
- Adjust Device Settings
- View Device Status
- View Sensor Data
- View Fault Codes
- Verify And Download Shared Data





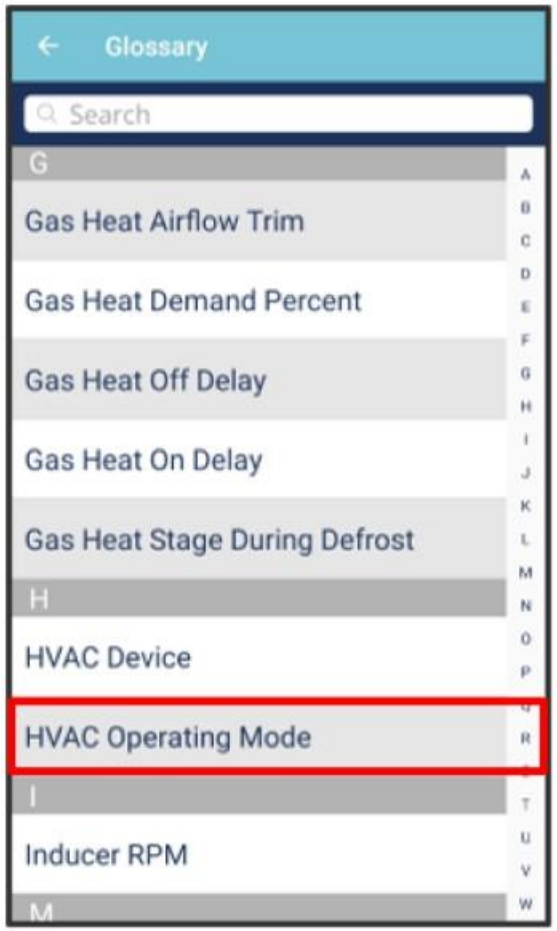
ComfortBridge™ technology

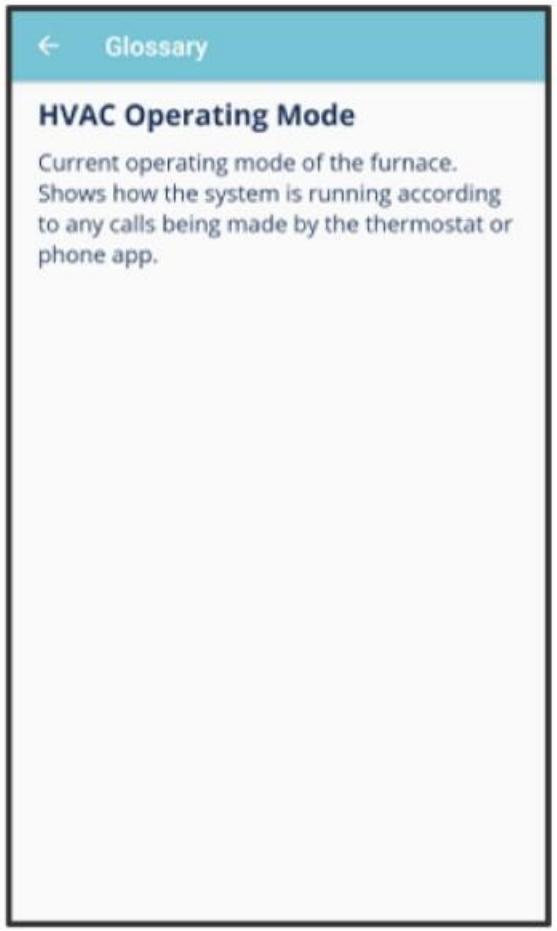
CoolCloud™ HVAC App

Glossary

The **Glossary** is intended to assist technicians and installers.

- Look up terminology used in the application.
- Select it for a detailed description.
- The **glossary** explains every term that is used in the application.

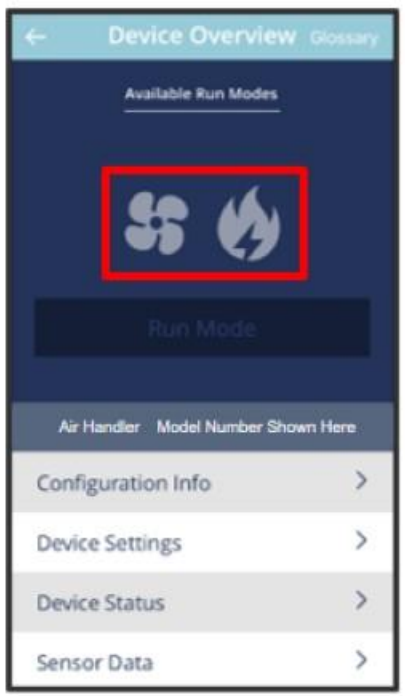


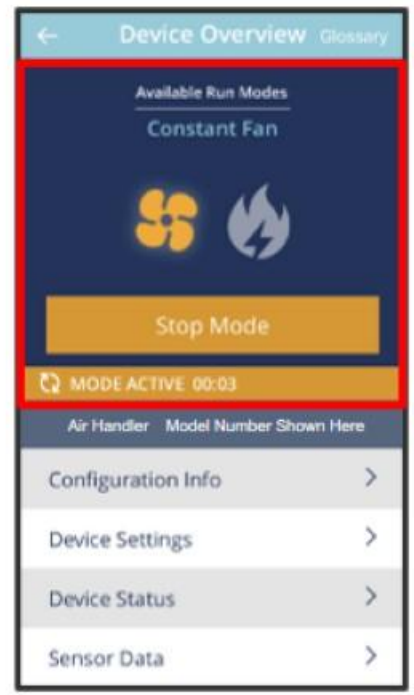


CoolCloud™ HVAC App

Running System Tests

- Select Desired Mode by touching its icon, then touch **Run Mode.**
- Use the slide bar to select desired percentage and touch **Run** to initiate test.
- This test can be performed in all modes for connected communicating equipment.





ComfortBridge™ technology

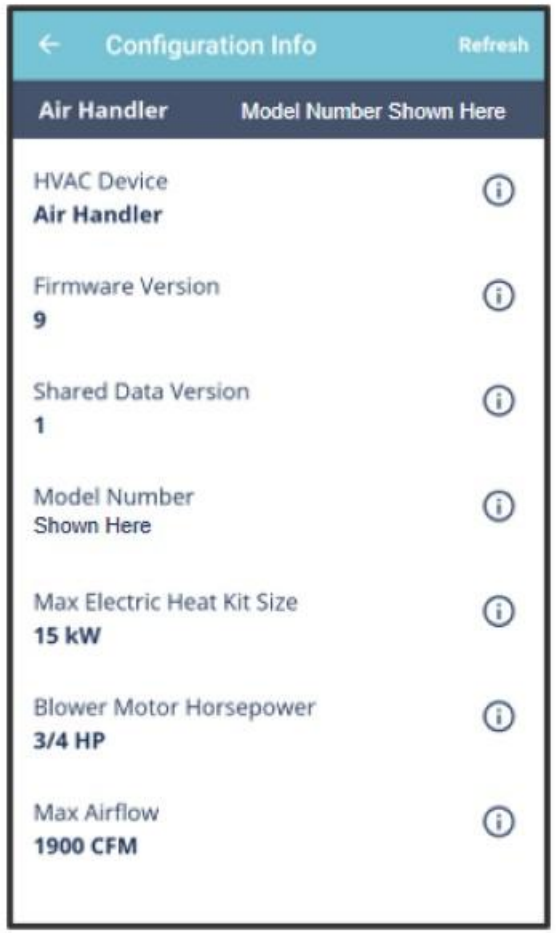
CoolCloud™ HVAC App

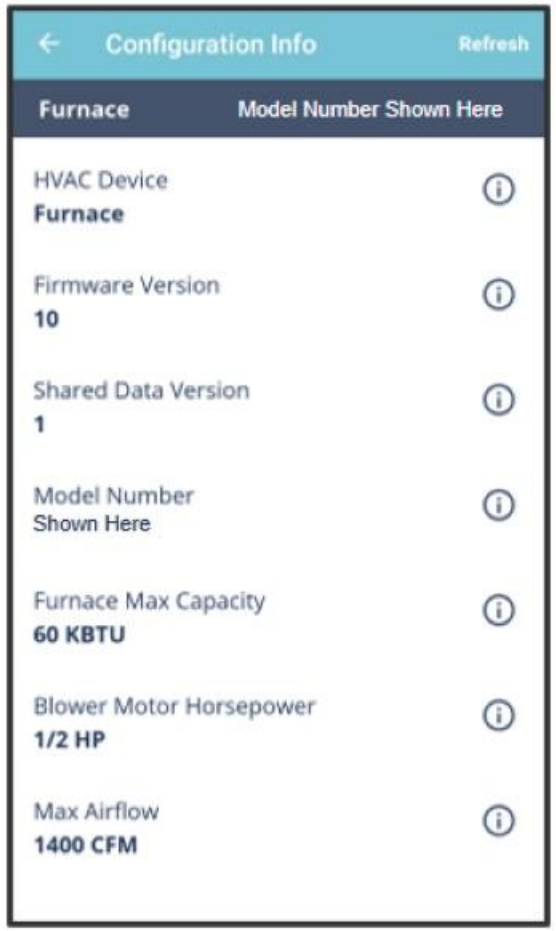
Configuration Information

Important information about the equipment:

- Type Of HVAC Device
- Firmware Version
- Shared Data Version
- Model Number
- Unit Capacity
- Max Electric heat Size
- Blower Horsepower
- Maximum Airflow

- If the model number of the equipment is displayed in the Configuration Info menu, the equipment contains valid shared data.





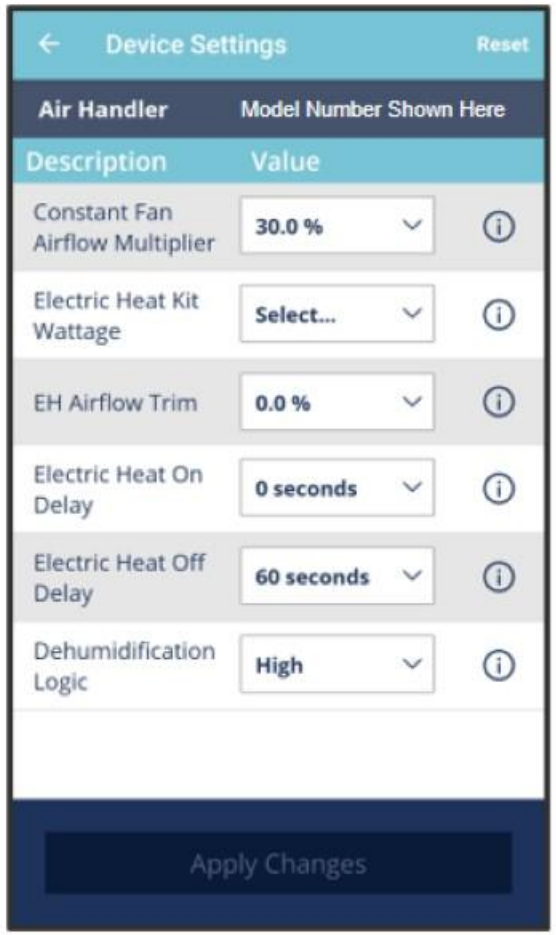
ComfortBridge™ technology

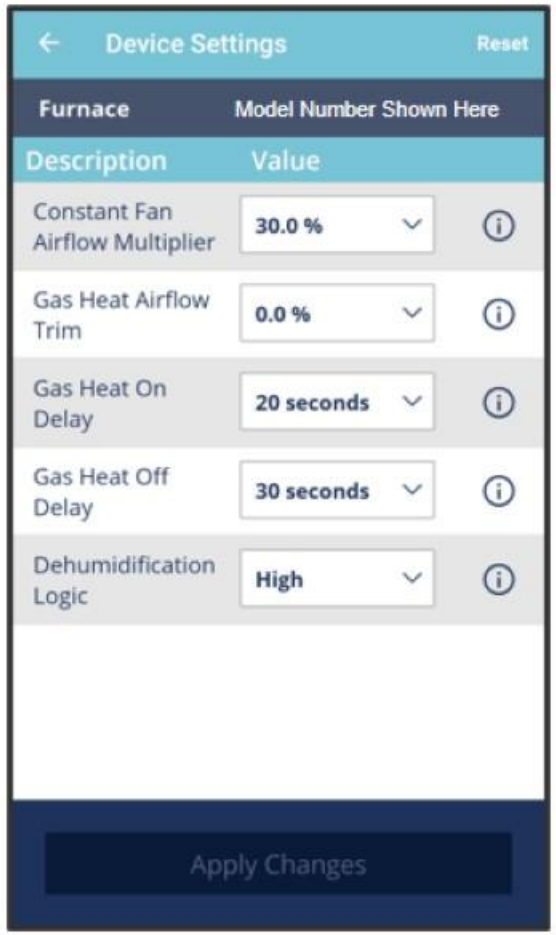
CoolCloud™ HVAC App

Device Settings

Available adjustable settings will appear in the **Device Settings** menu.

- Use the drop-down menus and press apply changes for new settings to take affect.
- Examples of available settings on furnace and air handler models are:
  - Constant Fan Airflow Multiplier
  - Electric Heat Kit Wattage
  - Heating Airflow Trim
  - Heat Blower On Delay
  - Heat Blower Off Delay
  - Dehumidification Logic





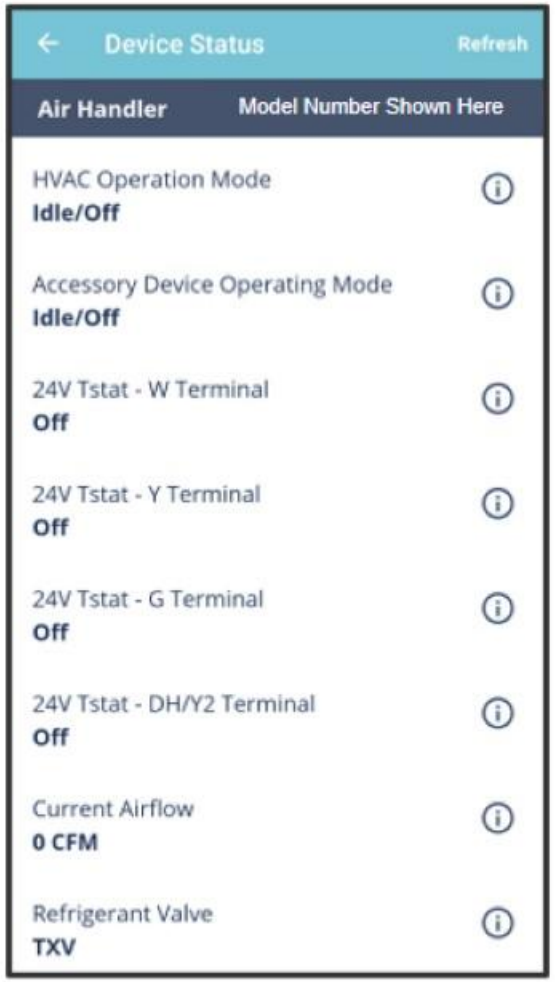
CoolCloud™ HVAC App

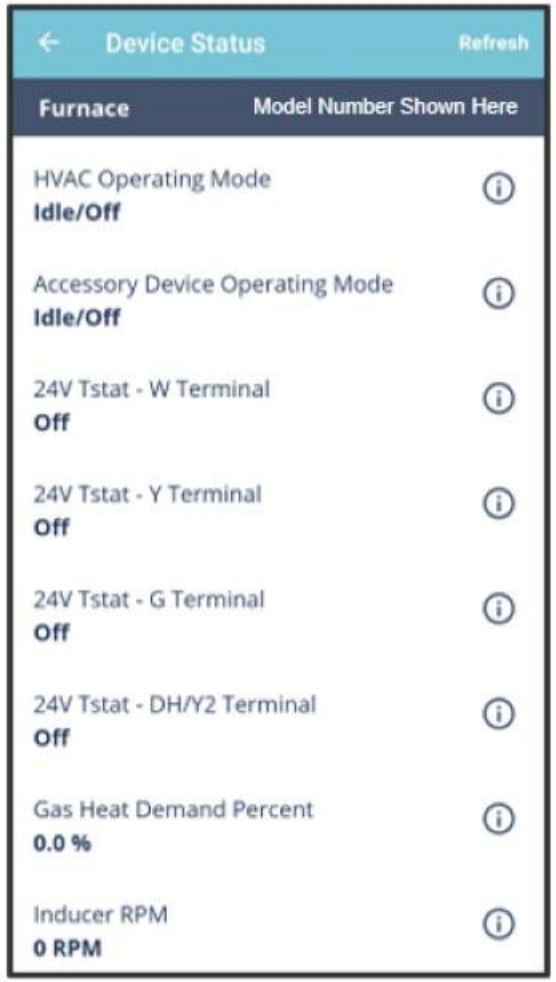
Device Status

Device Status can be viewed to see what the system is doing:

- Accessory Device Operational Mode
- Thermostat Signals
- Current Airflow
- Type of metering device used by an air handler
- Gas heating demand percent
- Inducer RPM

- All items have an icon next to them that will provide additional information.
- Press **Refresh** in the upper right corner for the most current information.





ComfortBridge™ technology

CoolCloud™ HVAC App

Sensor Data

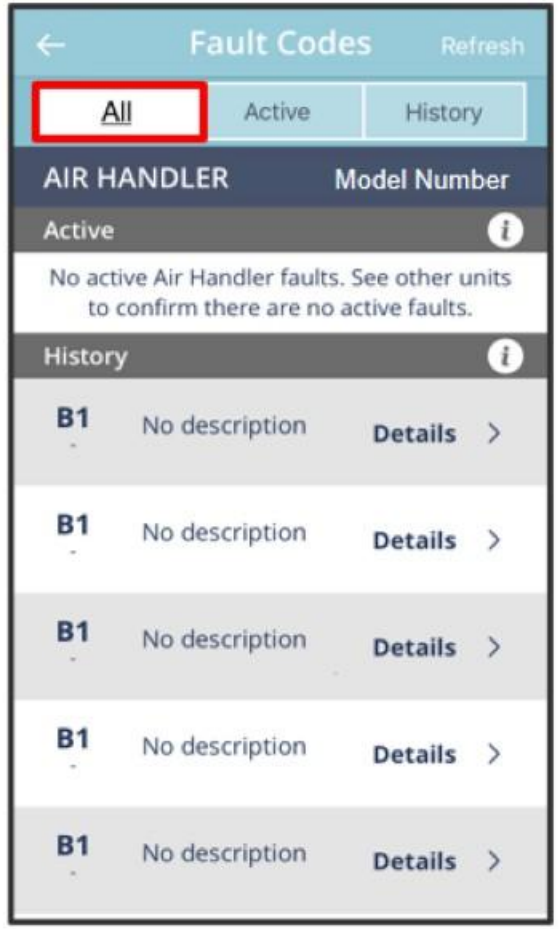
Sensor Data availability depends on type of units and accessories installed

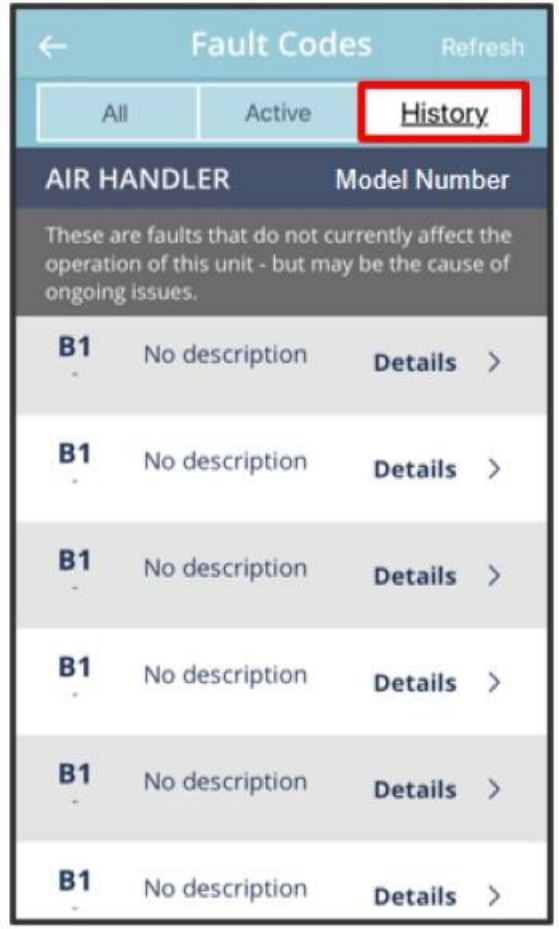
- ComfortBridge furnace models with optional temperature sensors installed will show:
  - Return Air Temperature
  - Supply Air Temperature
  - Temperature difference between the supply and return air sensors (Delta T)
- Communicating outdoor units will provide outdoor unit information
- Press **Refresh** in the upper right corner for the most current information

CoolCloud™ HVAC App

Viewing Fault Code History

- This menu will have three different fields; **All Faults**, **Active Faults**, and **Fault History**
- The faults displayed on each device's **Fault Code History** menu are faults for that device only
- Non-communicating outdoor units will never report active or inactive faults at an app level





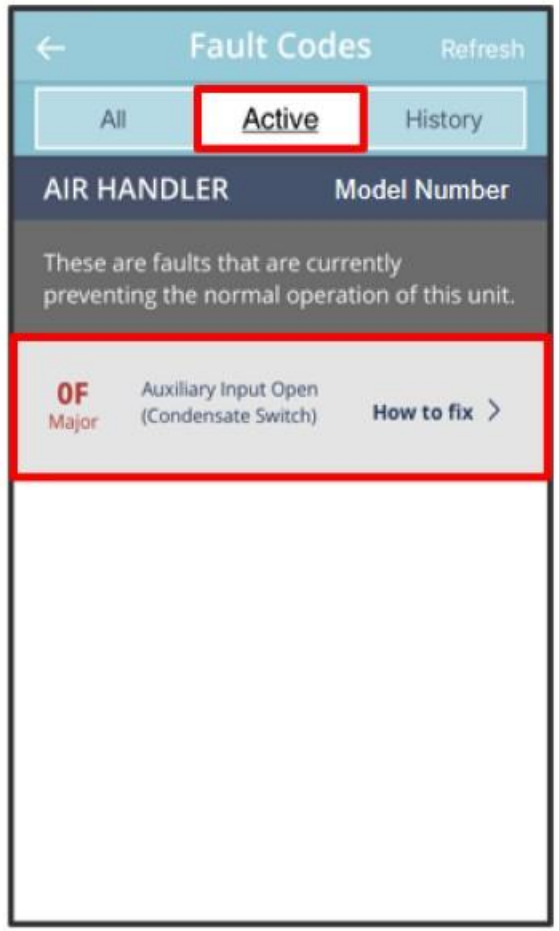
ComfortBridge™ technology

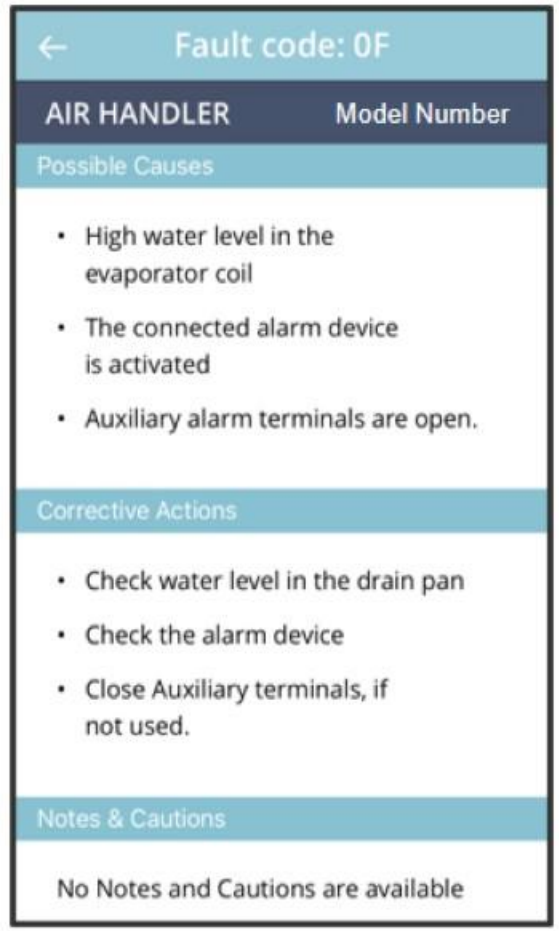
CoolCloud™ HVAC App

Active Fault Code Menu

The **Active Fault Menu** will show all faults that are currently preventing normal operation of the unit

- Faults have a **How to Fix** button next to them
- Opens a detailed menu explaining:
  - Possible causes
  - Corrective actions
  - Additional notes





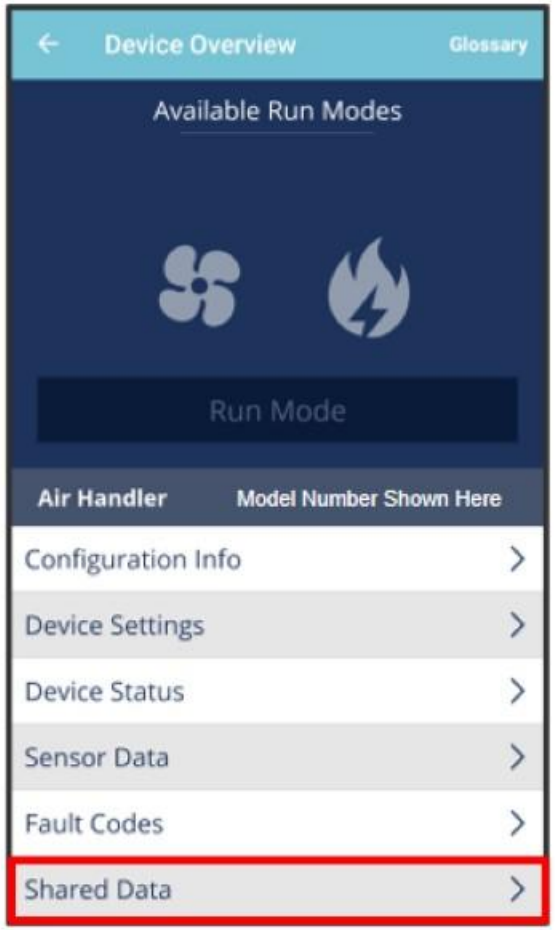
CoolCloud™ HVAC App

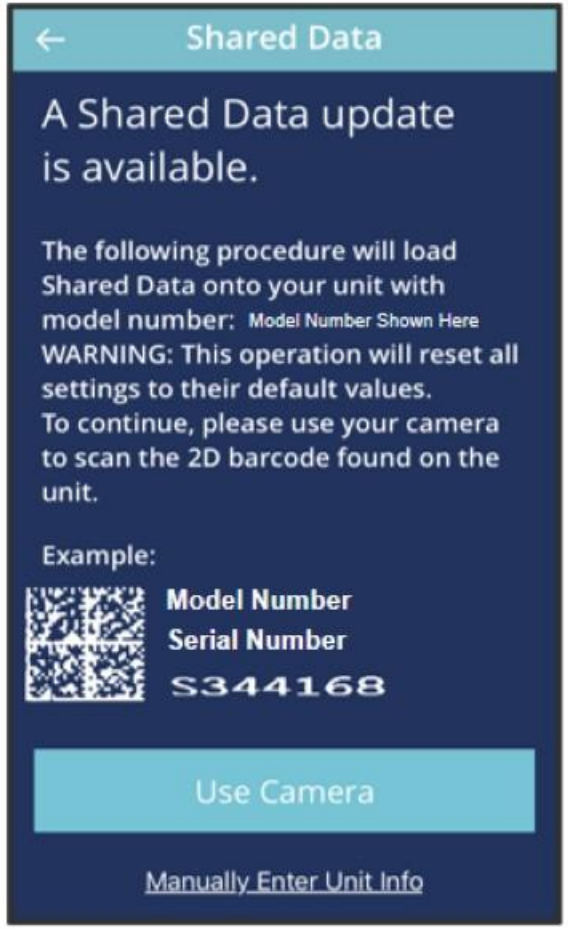
Shared Data

All communicating units contain **Shared Data** and will not operate without it.

- **Shared Data** is equipment specific programming parameters.
- Addressing **Shared Data** issues at a field level is extremely rare.
- Selecting **Shared Data** will allow the unit to verify if the correct **Shared Data** is present and up to date.
- If not, the app will give the user the option to update the **Shared Data.**

Note: Updating the **Shared Data** will reset most previous settings on equipment.





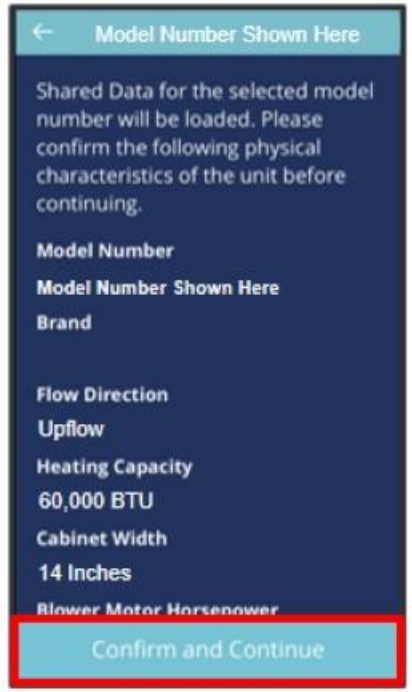
CoolCloud™ HVAC App

Updating Shared Data

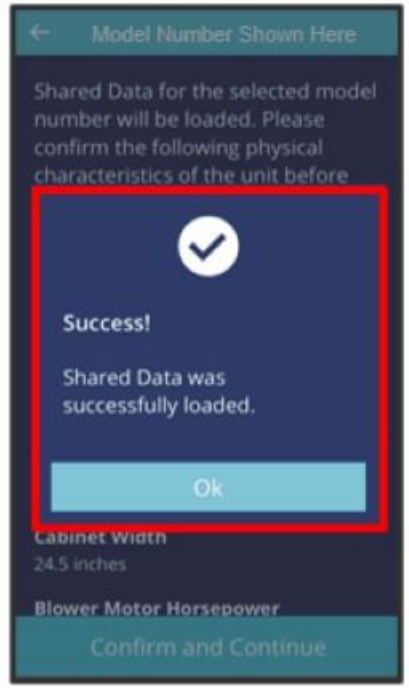
- User will be guided through the setup process and can use their phone's camera to scan the equipment's 2D barcode or enter the model number manually.

Scan QR Code or Enter Model Manually

Confirm Information



Success



CoolCloud™ HVAC App

Review

Where can you download the **CoolCloud**™ HVAC app?

Apple iTunes or **Google Play**™

What are the 2 methods of pairing the app to the equipment?

Circuit board code or thermostat tasks

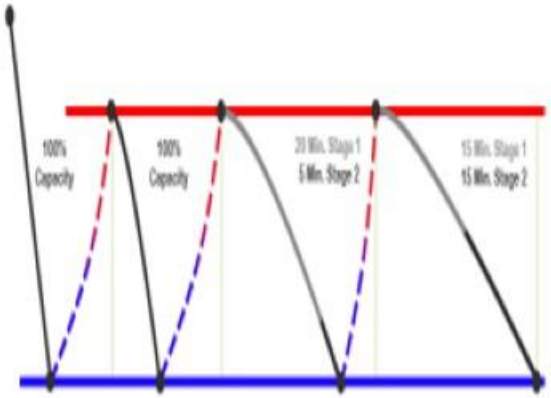
Which updates are required before being able to move on?

Mandatory updates

Can non-communicating outdoor units report their faults to a ComfortBridge indoor unit?

No

Module 4



Control Algorithms

Learning Objectives

- Review the **ComfortBridge**™ algorithms
- Explain the types of algorithms

ComfortBridge™ technology

Control Algorithms

ComfortBridge Control System | General Information

ComfortBridge™ equipped units have 2 different control algorithms which can be used to control equipment staging.

1. **Run Time Learning**
   - Automatically adjusts the capacity of the equipment to satisfy the thermostat as close to the selected run time as possible.
     - Uses run time of previous cycles to determine capacity.
2. **Rate Of Change – Furnaces Only**
   - Adjusts the capacity of the equipment based on real-time changes in return air temperature.
     - Lowers capacity with positive return air temperature progress.
     - Raises capacity with negative return air temperature progress.
   - Factory data reset will not erase algorithm selection or settings.
     - This algorithm does not share data with other system components and must have the algorithm selection and settings reprogrammed if the PCB is replaced.

Control Algorithms

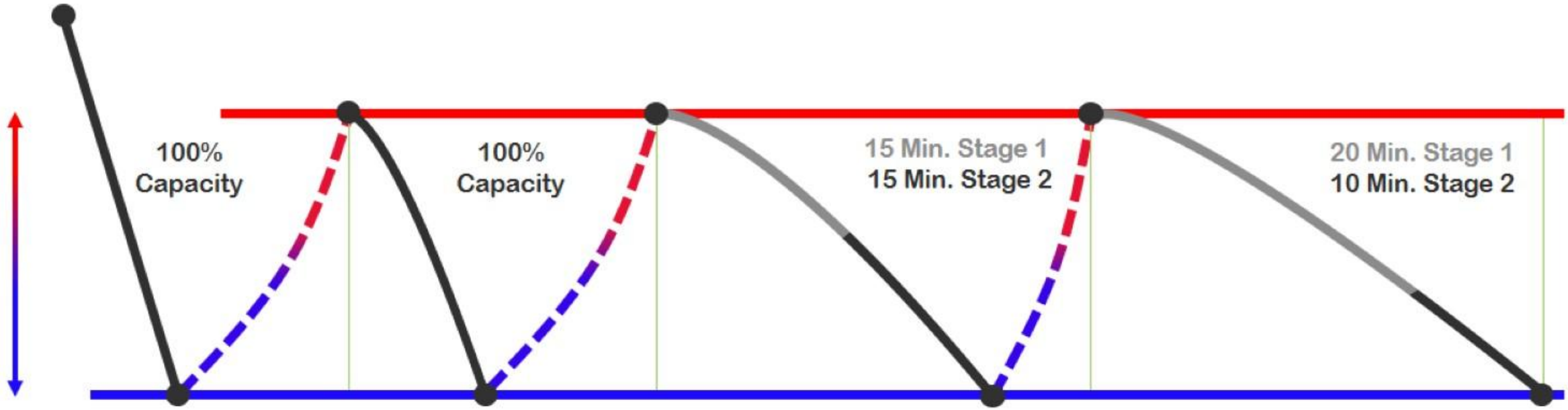
Run Time Learning Algorithm

- The system automatically adjusts equipment capacity attempting to satisfy the thermostat as close to a selected target run time as possible.
  - Target run time is adjustable and can be set independently in Comfort Setting Menu (CFS).
- It's generally observed that after a power cycle or mode change (cooling to heating or heating to cooling) the system will run full capacity for the selected mode during the first two thermostat calls.
- Based on selected target run time, and how long initial cycles take to satisfy the thermostat, the control algorithm may adjust the equipment's capacity for the next cycle.
  - Staging – Two stage
  - Capacity – Inverter or modulating furnace
- If the system can not satisfy the thermostat within the selected run time, the algorithm will operate the unit at 100% capacity until the thermostat is satisfied.

Note: actual run times may change depending on variations of load throughout the day.

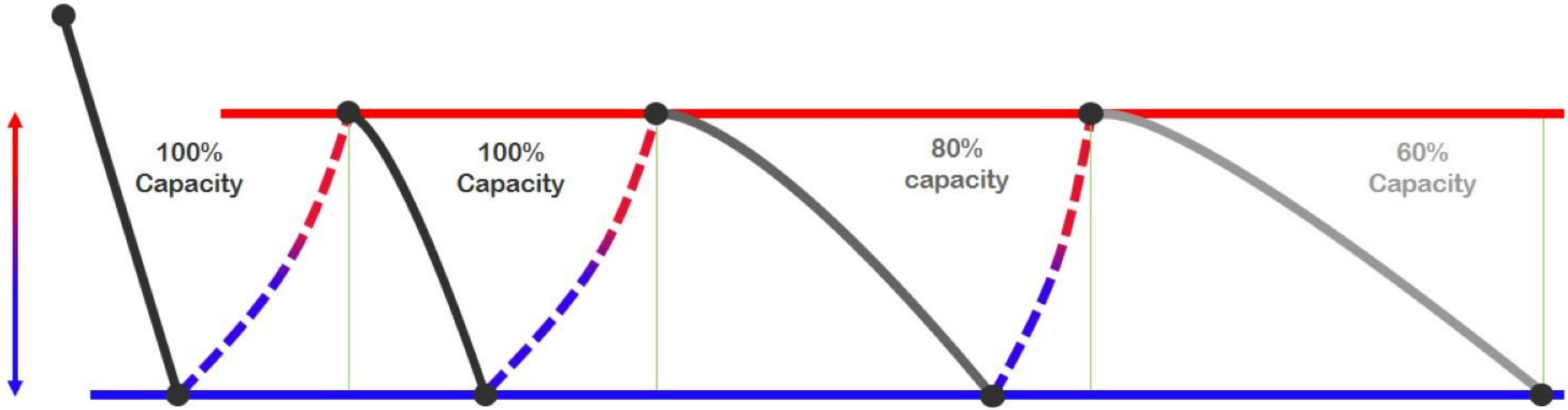
Control Algorithms

Run Time Algorithm | Cooling Call – Communicating Two-Stage Outdoor Unit



Control Algorithms

Run Time Algorithm | Cooling Call – Communicating Inverter Outdoor Unit



T-Stat Temp Swing

First two cycles from power up are always 100% capacity to allow for the Algorithm to create a baseline

Target Time = 30 Min.
Actual Run time = 25 Min.
Short 5 Min.

Target Time = 30 Min.
Actual Run Time = 30 Min.

ComfortBridge™ technology

Control Algorithms

Comfort Setting Menu

- There are 6 options available in the Comfort Setting Menu which impact both the System Target Runtime and Auxiliary Heat or Dual Fuel operations
- Comfort Setting Options 1 – 5 have set values for the System Target Runtime

CFS **Comfort Setting Option**	tgt **Target Time** (Minutes)	SUP **Stage Up Percentage** (%)	SdP **Stage Down Percentage** (%)	Ott **Over Target Threshold** (Strike Count)	Utt **Under Target Threshold** (Strike Count)
1	10	20	20	2	10
2	15	20	20	4	8
3	20	20	20	6	6
4	25	20	20	8	4
5 (Default)	30	20	20	10	2

Control Algorithms

System Target Runtime | Option 6

- Option 6 enables additional menus to customize all comfort settings.
- Note: it is critical that these numbers be set properly.
- If Comfort Setting option 3 is desired but a target time of 60 is preferred, select Comfort Setting Option 6 to enable all the adjustable menus, set the Target Time to 60 and make sure the other menus are set to match that of Comfort Setting Option 3.

Code	Menu	Minimum Value	Maximum Value	Default Value
tgt	**Target Time**	1 minute	240 minutes	30 minutes
SUP	**Stage Up Percent**	0%	100%	20%
SdP	**Stage Down Percent**	0%	100%	20%
Ott	**Over Target Threshold**	1 strike	254 strikes	20 strikes
Utt	**Under Target Threshold**	1 strike	254 strikes	20 strikes

Control Algorithms

Comfort Setting Menu | Auxiliary Heat or Dual Fuel operations

- Only applies if a communicating heat pump is installed
- Based on Target Run Time - Control determines if heat pump can satisfy demand
  - If not…
    - Heat pump is temporarily locked out
    - Secondary heat is used to meet demand
    - Heat pump unlocked when control sees fit

- Four adjustable items associated with Auxiliary Heat or Dual Fuel operations
  - SUP – Stage Up Percent
  - OtE – Over Target Threshold
  - SdP – Stage Down Percent
  - UtE – Under Target Threshold

ComfortBridge™ technology

Control Algorithms

Comfort Setting Menu | SUP – Stage Up Percent

How long beyond the target runtime the system should continue running the heat pump before bringing on the auxiliary heat or transitioning to the gas furnace.

- Example – Heat Pump with auxiliary electric heat
  - Target Run Time of 25 minutes
  - Stage Up Percentage of 20
  - If heat pump cannot satisfy set point within 30 minutes [25+(25 x .2)], the heat pump will continue running, the electric heaters will be turned on, and a strike against the heat pump is incremented.
- Example – Dual Fuel
  - Target Run Time of 25 minutes
  - Stage Up Percentage of 20
  - If heat pump cannot satisfy set point within 30 minutes [25+(25 x .2)], the heat pump will be turned off, the furnace will fire up, and a strike against the heat pump is incremented.

Control Algorithms

Comfort Setting Menu | OtE – Over Target Threshold

Number of consecutive times (Strikes) the system must bring on auxiliary heat or transition to the gas furnace before using auxiliary heat or the gas furnace at the beginning of the heating cycle.

- Example – Heat Pump with auxiliary electric heat
  - Over Target Threshold setting of 10
  - If heat pump cannot satisfy set point within the selected target run time 10 consecutive times, the electric heaters will be turned on along with the heat pump for the next heating cycle.
- Example – Dual Fuel
  - Over Target Threshold setting of 10
  - If heat pump cannot satisfy set point within the selected target run time 10 consecutive times, the heat pump will be temporarily locked out, and the gas furnace will be used for the next heating cycle.

ComfortBridge™ technology

Control Algorithms

Comfort Setting Menu | SdP – Stage Down Percent

Used to determine when to unlock and run the heat pump again – Applies when the heat pump is in a temporary lockout condition.

- Example – Heat Pump with auxiliary electric heat
  - Target Run Time of 25 minutes
  - Stage Down Percentage of 20
  - If heat pump and auxiliary electric heat can satisfy the thermostat in less than 20 minutes [25-(25 x .2)], a strike against the electric heater is incremented.
- Example – Dual Fuel
  - Target Run Time of 25 minutes
  - Stage Down Percentage of 20
  - If the gas furnace can satisfy the thermostat using low stage in less than 20 minutes [25-(25 x .2)], a strike against the furnace is incremented.

ComfortBridge™ technology

Control Algorithms

Comfort Setting Menu | UtE – Under Target Threshold

Number of consecutive times (Strikes) the system must satisfy the thermostat early before unlocking the heat pump.

- Example – Heat Pump with auxiliary electric heat
  - Under Target Threshold setting of 5
  - If heat pump and auxiliary electric heaters satisfy the thermostat early 5 consecutive times, the electric heaters will not be used at the beginning of the next heating cycle.
- Example – Dual Fuel
  - Under Target Threshold setting of 5
  - If gas furnace satisfies the thermostat early 5 consecutive times, the heat pump will be temporarily unlocked and will be used at the beginning of the next heating cycle.

Note: If the heat pump is unable to satisfy the thermostat by itself during the first cycle after being unlocked, the strike count will be reset, and the heat pump will be locked out again.

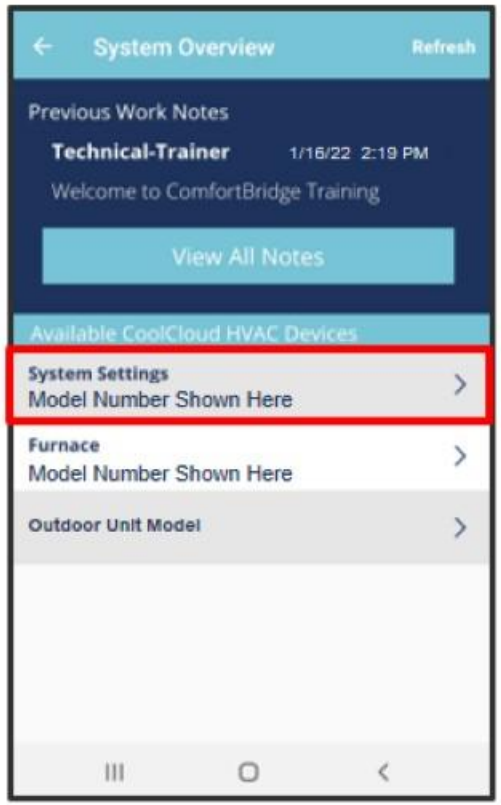
ComfortBridge™ technology

Control Algorithms

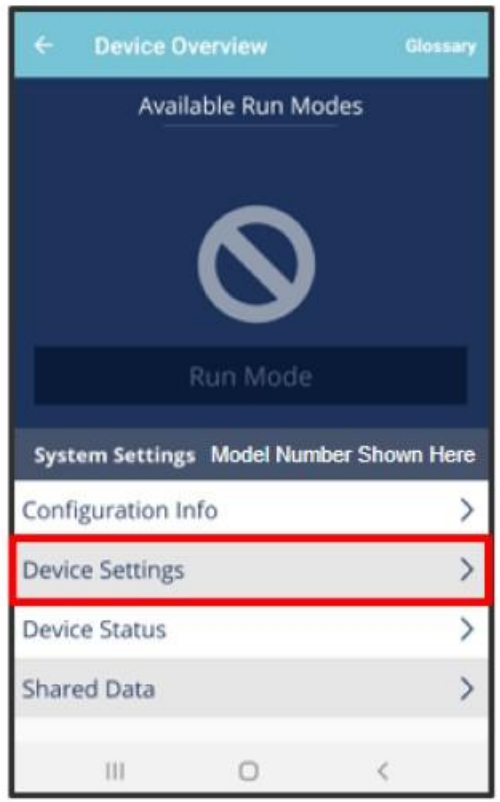
Setting Run Time Control Algorithm

1. Pair with desired system

2. Select **System Settings**



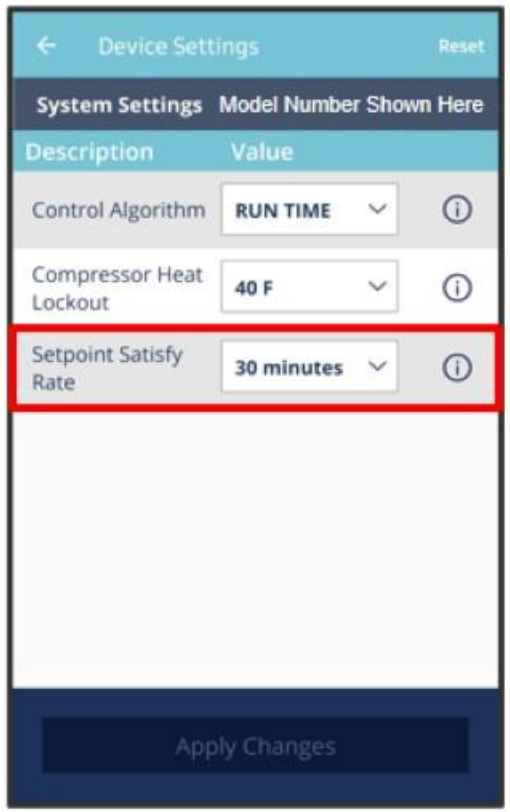
3. Select **Device Settings**



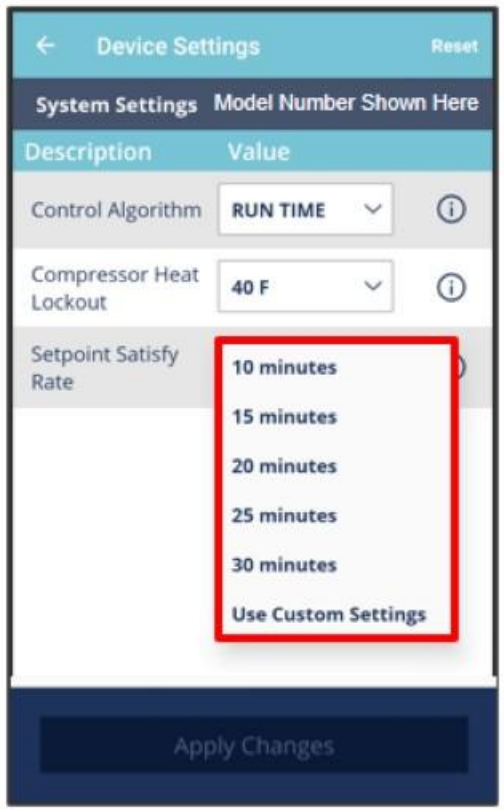
Control Algorithms

Setting Run Time Control Algorithm (Cont.)

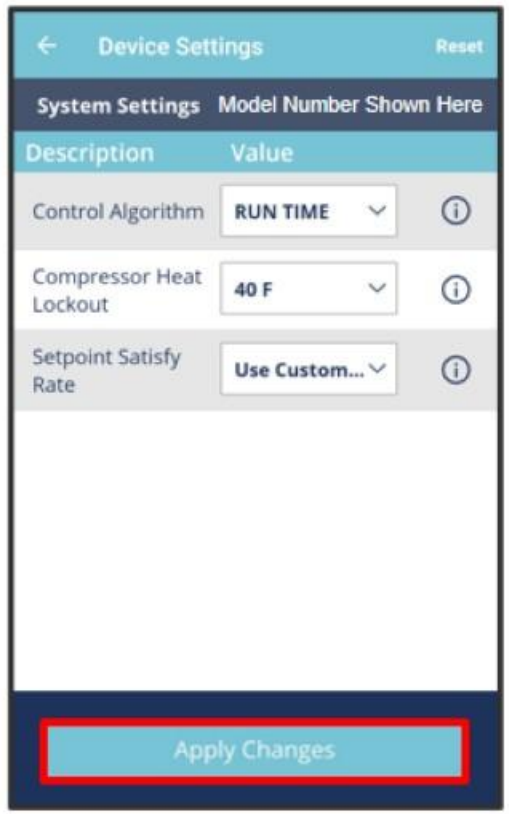
4. Select **Set Point Satisfy Rate**



5. Select **Use Custom Settings**



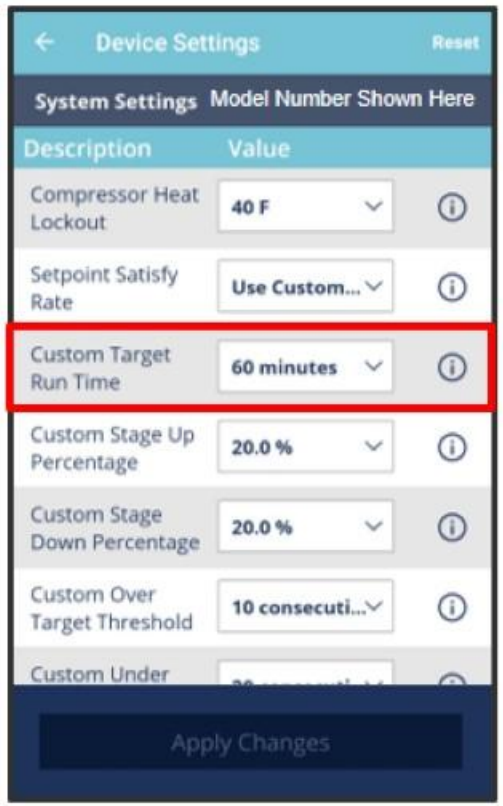
6. Press **Apply Changes**



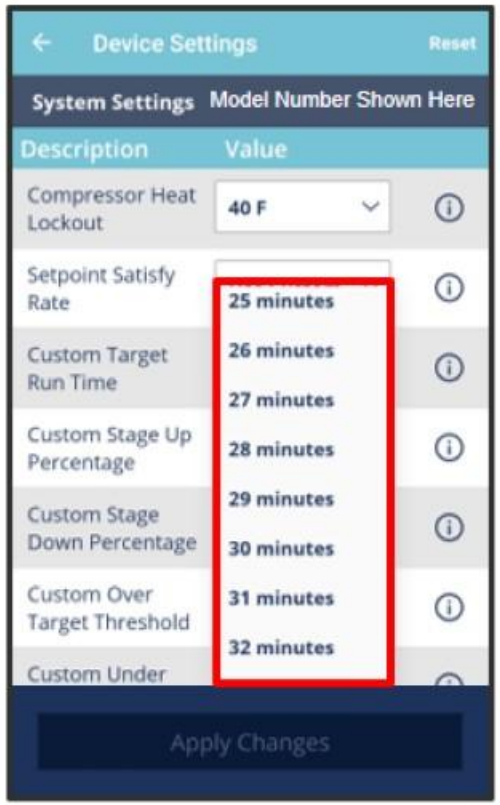
Control Algorithms

Setting Run Time Control Algorithm (Cont.)

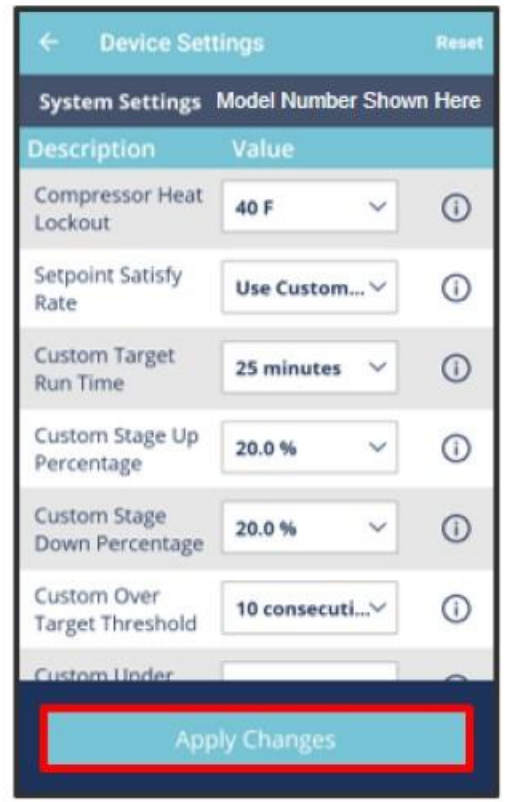
7. Select **Custom Target Run Time**



8. Set Desired Target Time



9. Press **Apply Changes**



Control Algorithms

Rate Of Change Algorithm

The system automatically adjusts heating or cooling capacity based on real time changes in return air temperature

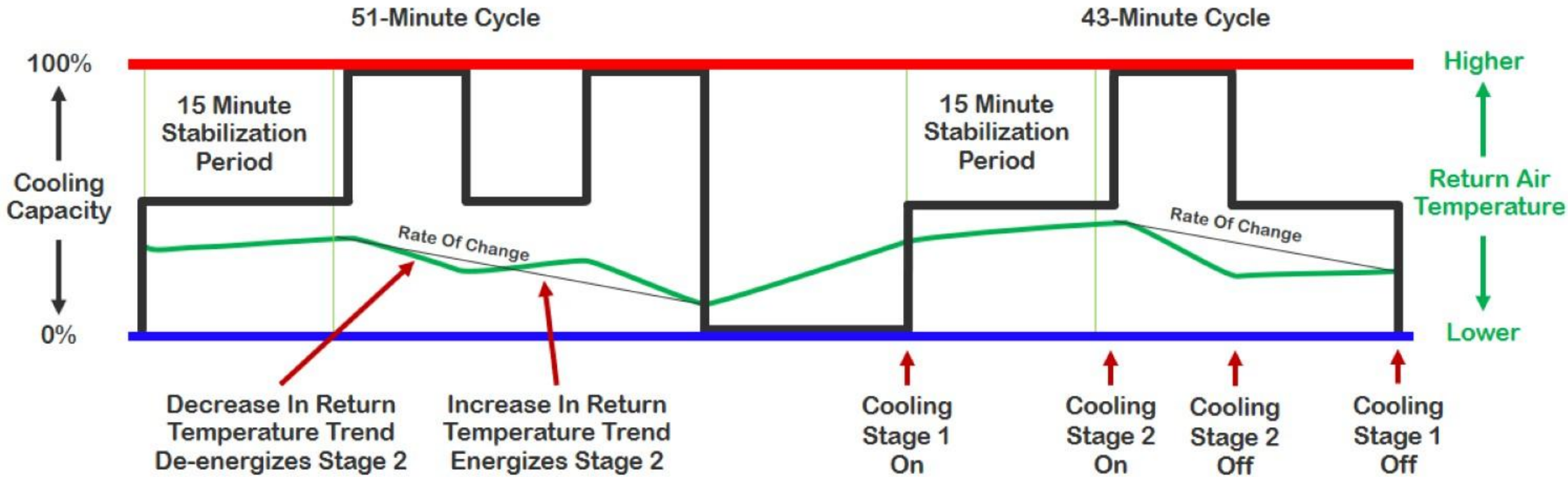
- Rate of change has adjustable settings from 1 – 10 (default 5)
  - 1 least aggressive – higher energy efficiency
  - 10 most aggressive – tighter control of space temperature
- Initiates heating/cooling staging at 50% demand or first stage
- 15-minute duct stabilization timer
- Samples return air temperature every 3 minutes
  - Gradually ramps demand down to 25% for positive return air progress
  - Gradually ramps demand up to 100% for negative return air progress

Note: actual run times may change depending on variations of load throughout the day

Control Algorithms

Rate Of Change Algorithm | Cooling Call – Communicating Two Stage Outdoor Unit

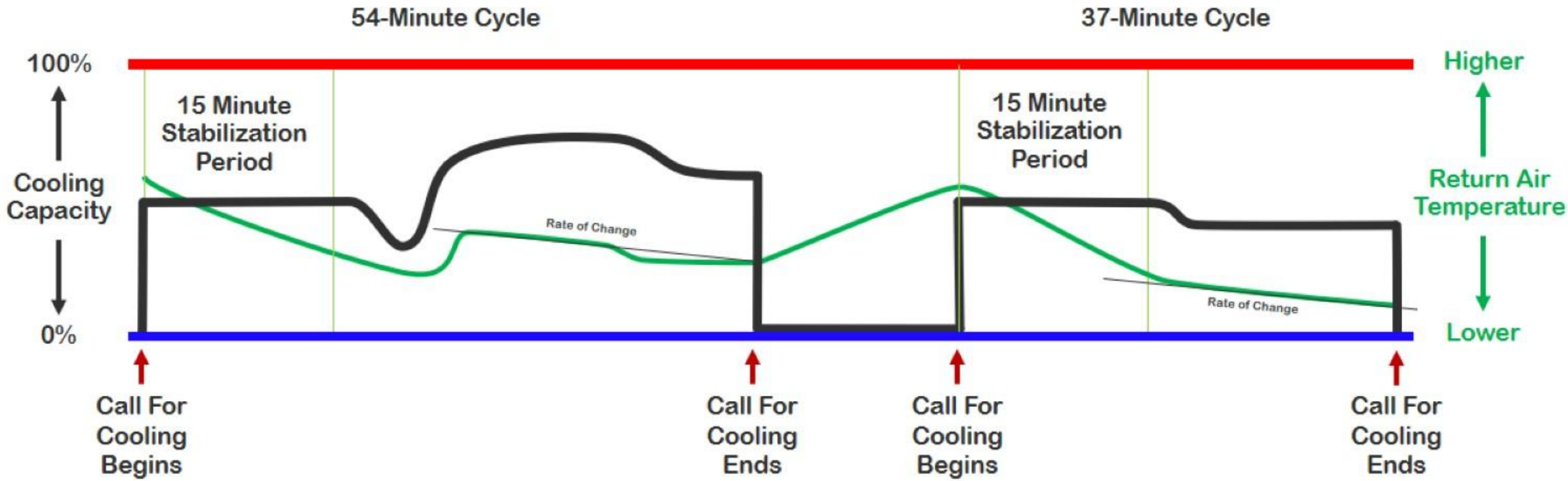
Continually adjusting staging during cycle to maintain a constant rate of change optimizing homeowner comfort levels and efficiency



Control Algorithms

Rate Of Change Algorithm | Cooling Call – Communicating Inverter Outdoor Unit

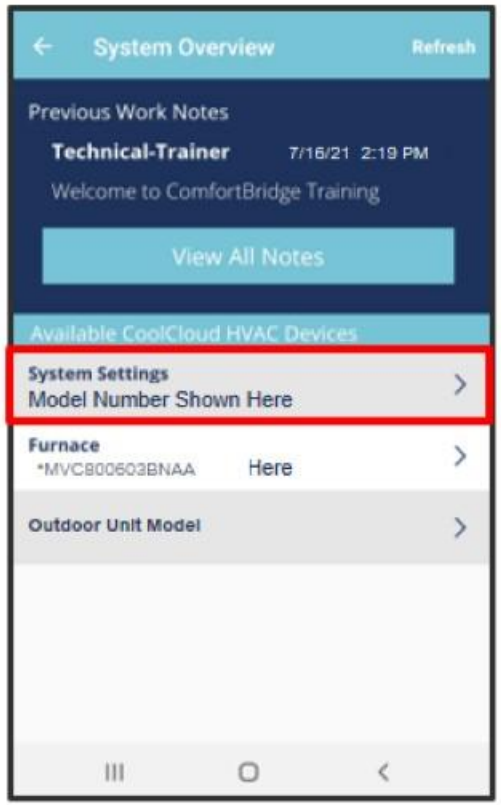
Continually adjusting demand during cycle to maintain a constant rate of change optimizing homeowner comfort levels and efficiency

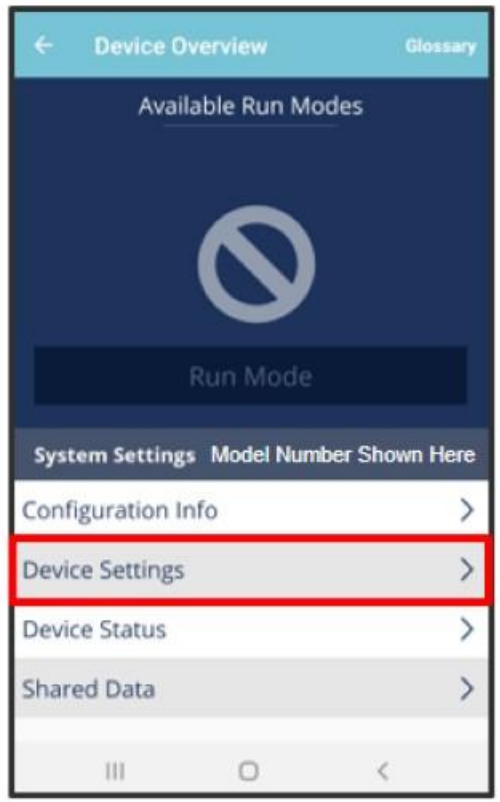


Control Algorithms

Setting Rate Of Change Control Algorithm

1. Pair With Desired System
2. Select **System Settings**
3. Select **Device Settings**

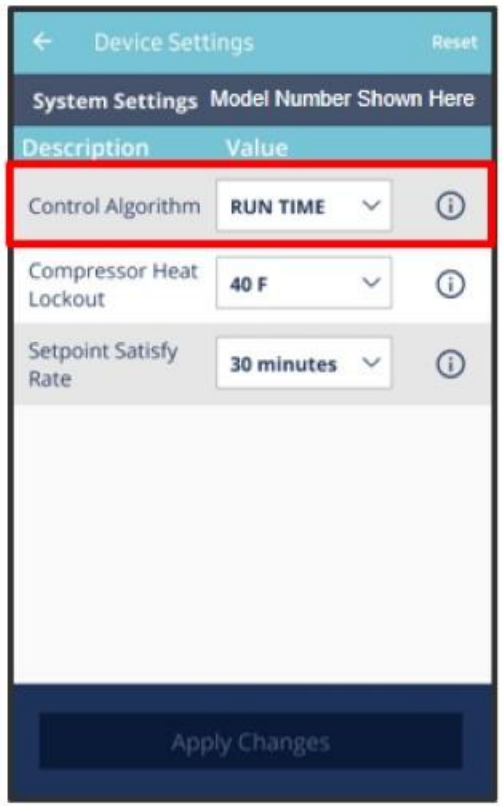




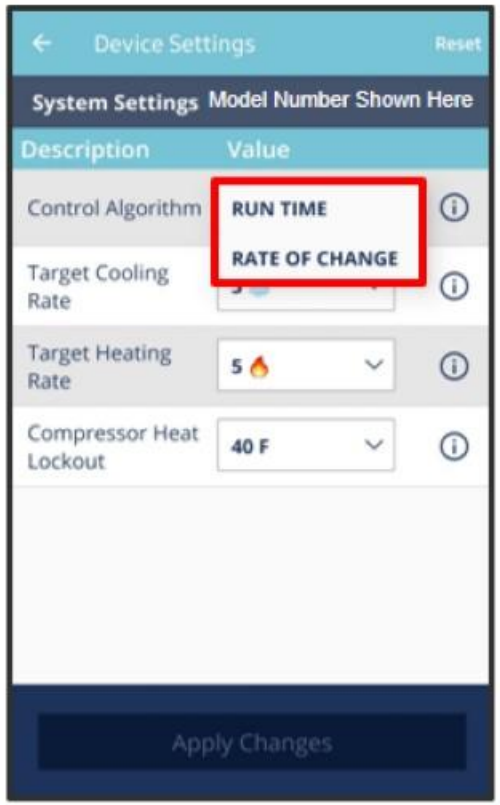
Control Algorithms

Setting Rate Of Change Control Algorithm (Cont.)

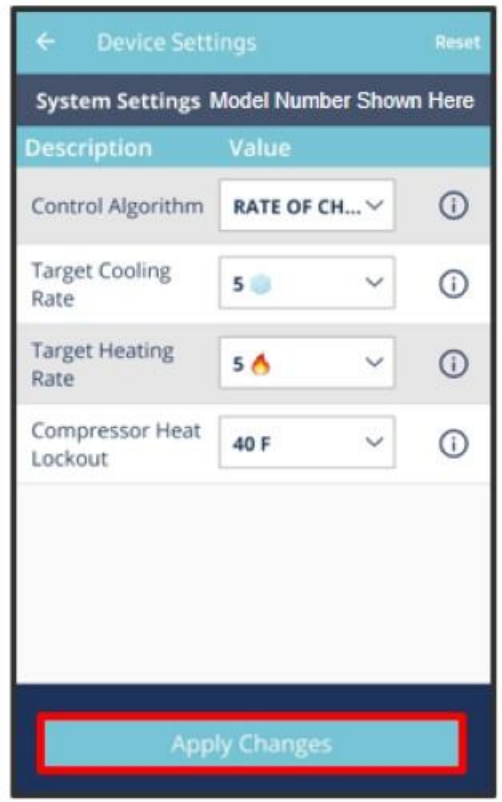
4. Select **Control Algorithm**



5. Set Desired Algorithm Type



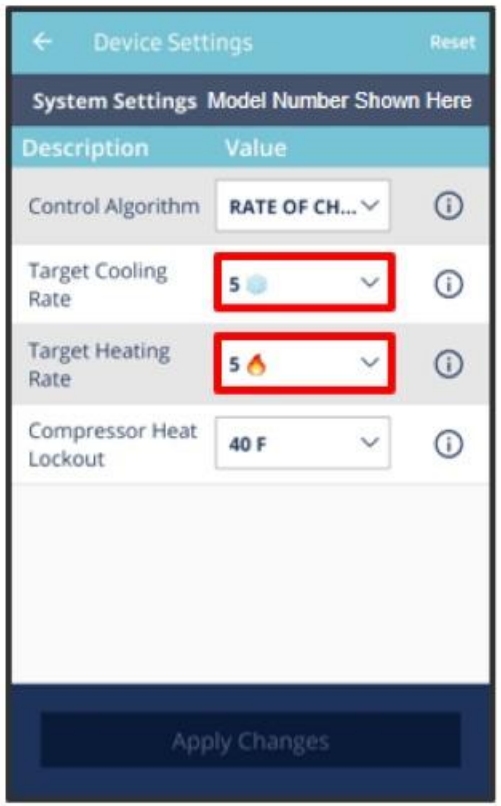
6. Press **Apply Changes**



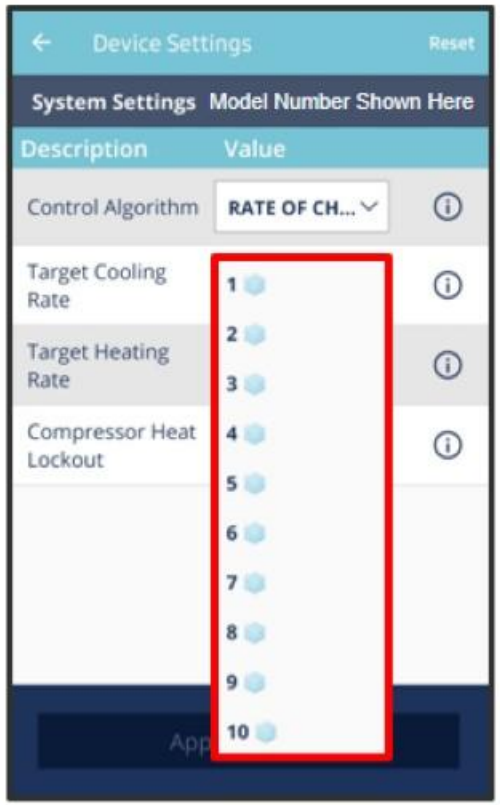
Control Algorithms

Setting Rate Of Change Control Algorithm (Cont.)

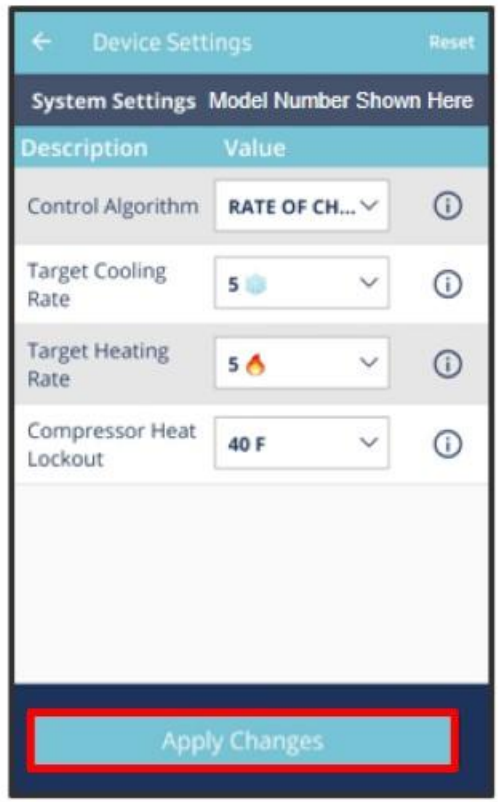
7. Select **Target Heating** or **Target Cooling** Rate



8. Set Desired Target Rate



9. Press **Apply Changes**



Control Algorithms

Review

What is the factory default target run time for the Run Time Algorithm?

30 minutes

When are stage up/down percentages and under/over target thresholds applicable?

Communicating heat pump applications with Auxiliary Heaters or Dual Fuel applications

What two types of control algorithms does **ComfortBridge™** offer?

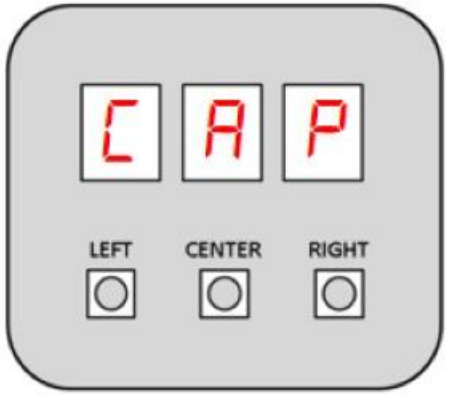
Run Time Learning and Rate Of Change

After changing a setting on the application, what must you press?

Apply Changes

Module 5

Settings



Learning Objectives

- Explain push button menu navigation
- Lean the steps for setting up a non-communicating outdoor unit
- Describe important settings

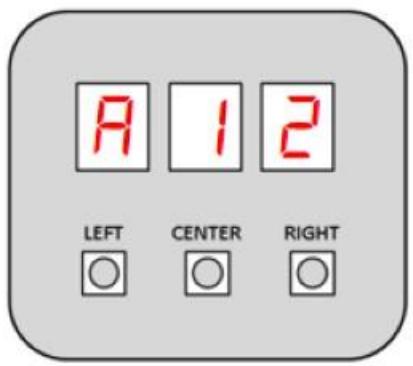
ComfortBridge™ technology

Settings

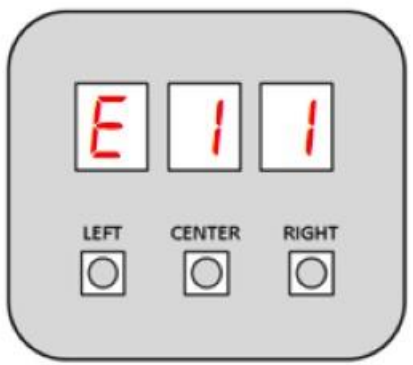
System Status | 7-Segment Display

- When looking at the control board, the three 7-Segment displays (located next to the push buttons) will be displaying system status.
- System status includes:
  - Current mode of operation
  - Airflow being delivered by the blower in hundreds of CFM
  - Active error codes

Air Conditioner – High Stage



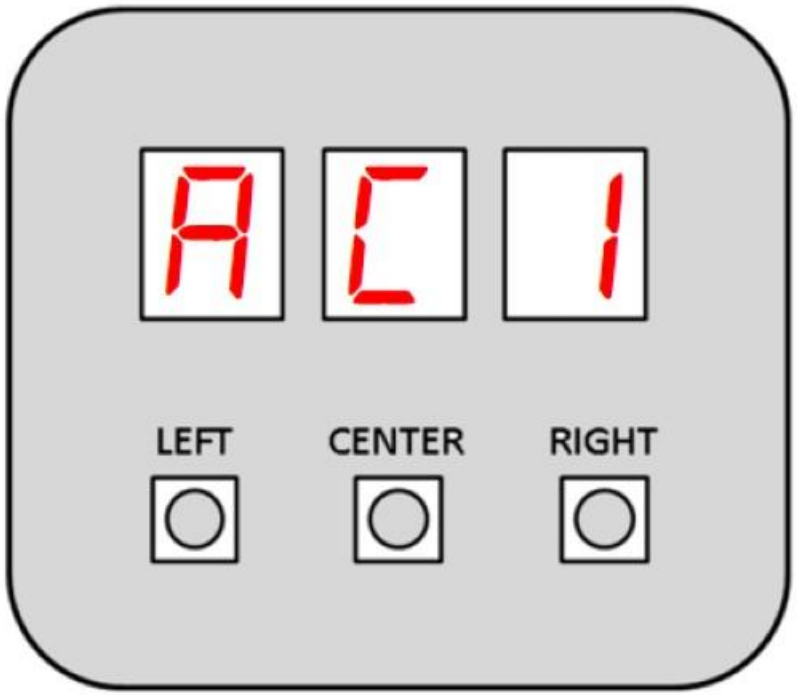
Airflow – 1200 CFM



Error Code – E11

Settings

Display Status Codes



*Examples shown. Full list can be found in units Installation or Service manual

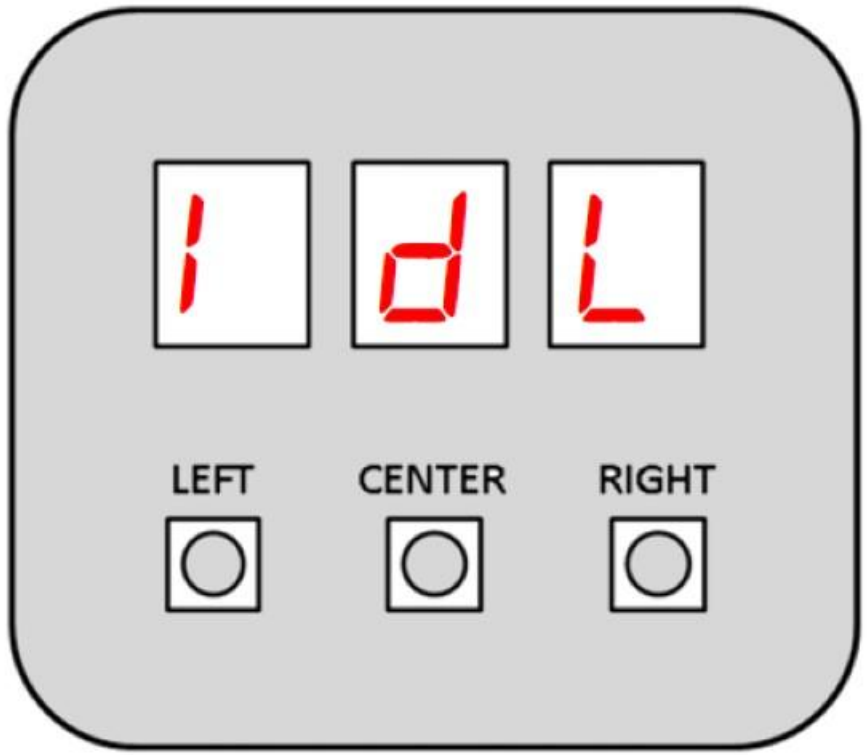
LED Display	Description Of Status Code
1AC	Compressor Cooling, Low Stage (Non-Communicating Units)
2AC	Compressor Cooling, High Stage (Non-Communicating Units)
1AC	Compressor Heat, Low Stage (Non-Communicating Units)
2AC	Compressor Heat, High Stage (Non-Communicating Units)
AC	Compressor Cooling (Single-Stage Non-Communicating)
AC 1	Compressor Cooling, Low Stage (Communicating Units)
AC2	Compressor Cooling, High Stage (Communicating Units)
dFt	Defrost
dHU	Dehumidification
FAn	Constant Fan
u9H	Modulating Furnace Heating
AC	Compressor Heat, Single Stage (Non-Communicating Units)
HP 1	Compressor Heat, Low Stage (Communicating Units)
HP2	Compressor Heat, High Stage (Communicating Units)
1 dL	Idle
uAC	Inverter Heating
uHP	Inverter Cooling

ComfortBridge™ technology

Settings

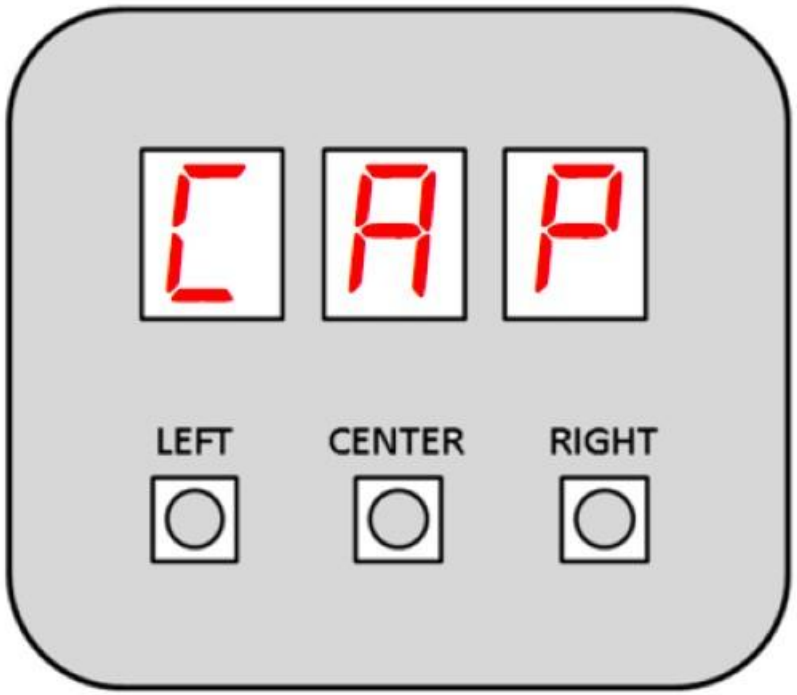
Push Button Menu Navigation

- Use the **Left** and **Right** buttons to scroll between menus.
- Use the **Center** button to select desired menu when menu code is shown on 7-segment displays.
- Current menu setting will be displayed.
- The display will flash while using the **Left** and **Right** buttons to navigate through available menu options.
- Use the **Center** button to select the displayed option (once selected, the display will stop flashing).
- Press the **Center** button again to confirm selection and return to the main menu.



Settings

Menu Codes



*Examples shown. Full list can be found in units Installation or Service manual

LED Display	Description of System Status
CAP	Cooling Airflow Profile setting (default = profile D shown as 4)
CbP	Heat Pump compressor lockout temperature (default = 45°F)
CFS	Comfort Setting Menu (default = 5)
Crg	Enable or disable inverter charge mode
CtF	Cooling Airflow Trim (default 0%)
FSd	Constant Fan Speed as percent of maximum airflow (default = 25%
gAF	Gas Heat Airflow (percentage of maximum system airflow)
gFd	Gas Heat Fan Off Delay (default = 90 seconds)
gnd	Gas Heat Fan On Delay (default = 30 seconds)
gPt	Enables gas heat at 100% for pressure testing
gtF	Gas Heat Airflow Trim (default = 0%)
LbF	View 6 most recent fault codes and clear all fault codes if desired
Lrn	Restart communications between the indoor and outdoor unit.
OdS	Select number of stages for non-communicating outdoor unit (default = none)
rFd	Resets furnace settings to factory defaults.
tgt	Select the target time the system will attempt to satisfy the thermostat
ton	Indoor Airflow for non-communicating outdoor units (default = 6 tons)

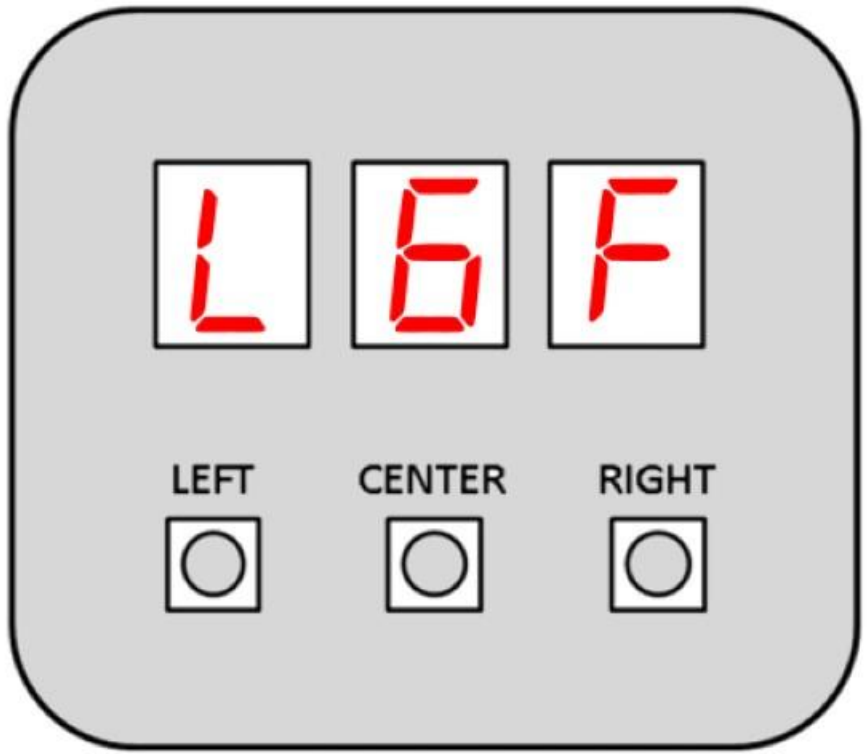
ComfortBridge™ technology

Settings

Fault Menu Navigation | Push Buttons

To access the fault menu:

- Use the **Left** and **Right** buttons to scroll between menus
- Use the **Center** button to select the Last Six Faults menu when menu code L6F is shown on 7-segment displays
  - The most recent fault will be shown first
- Use the **Left** and **Right** buttons to scroll between faults
  - Pressing the **Right** button will show the next fault
  - Pressing the **Left** button will show the previous fault
  - Only 6 faults can be stored in memory, once the last fault is reached, the first fault will be shown
- Press and hold the center button for 5 seconds to clear faults.
- All stored faults will be erased, and the display will flash - - - three times and return to L6F



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Settings

Diagnostic Codes

Symptom	Display	Fault Description	Corrective Actions
Furnace fails to operate Integrated control module LED display provides no signal	No display	No line voltage power No 24-volt power to integrated control module Blown fuse or tripped breaker Integrated control module is non-functional	Restore high voltage power to furnace Restore 24-volt power to integrated control module Correct condition which caused fuse to open, replace fuse Replace non-functional integrated control module
Furnace fails to operate	EE0	Furnace lockout due to an excessive number of ignition "retries" (3 total) Failure to establish flame Loss of flame after establishment	Locate and correct gas interruption Replace or realign igniter Check flame sense signal, clean sensor if coated or oxidized Check flu piping for blockage, proper length, elbows, and termination Verify proper induced draft blower performance
Circulator blower runs continuously No furnace operation	EE3	Primary limit circuit is open Insufficient conditioned air over the heat exchanger Blocked filters, restrictive ductwork, improper circulator blower speed, or failed circulator blower motor Loose or improperly connected wiring in high limit circuit	Check filters and ductwork for blockage, clean filters or remove obstruction Check circulator blower speed and performance, correct speed or replace blower motor if necessary Tighten or correct wiring connection
Furnace fails to operate	E11	Open roll out switch	Check for correct gas pressure Check for proper burner alignment Check for and correct burner restriction

*Examples shown. Full list can be found in units Installation or Service manual

ComfortBridge™ technology

Settings

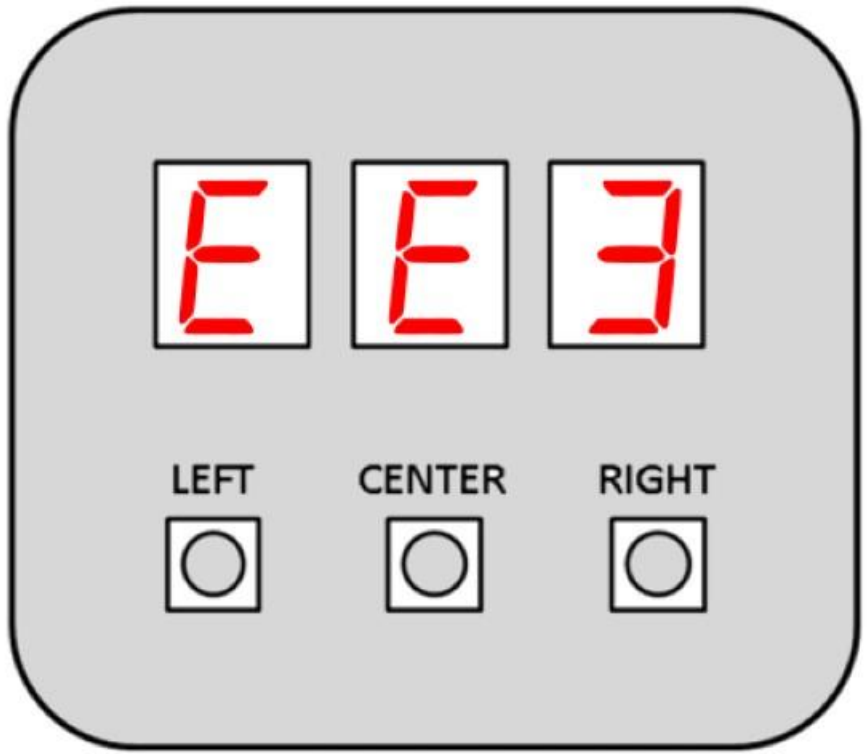
Error Code Example: EE3 | Primary Limit Open

Description: Primary limit circuit is open

- Possible Causes:
- Insufficient conditioned air over the HX. Blocked filters, restrictive ductwork, improper circulator blower speed, or failed circulator blower motor
- Lose or improperly connected wiring in high limit

Corrective Actions:

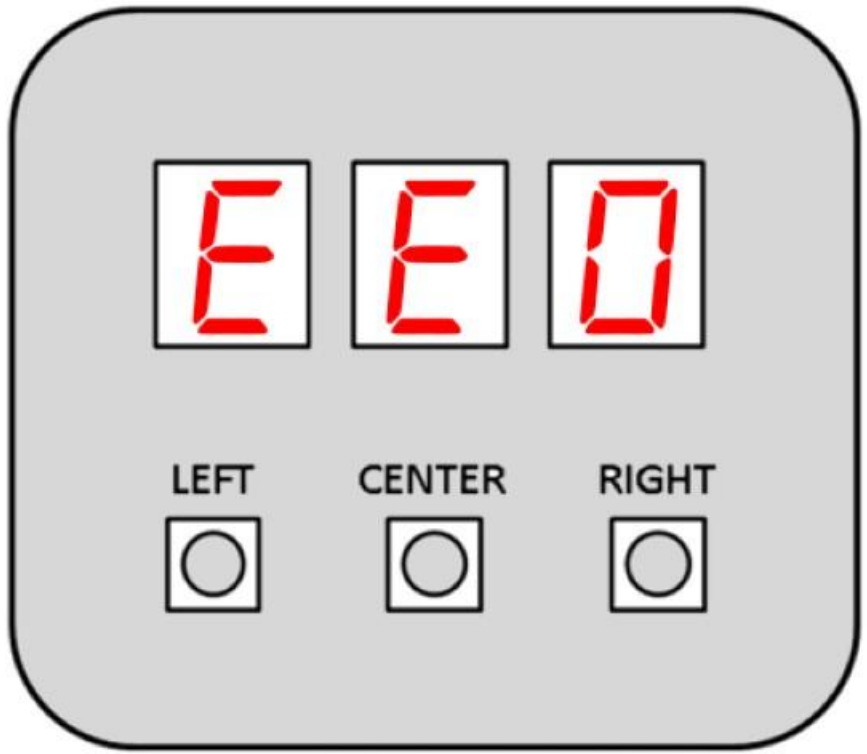
- Check filters and ductwork for blockage. Clean filters and remove obstruction
- Check circulator blower speed and performance. Correct speed or replace blower motor if necessary
- Tighten or correct wiring connection



Settings

Error Code Example: EE0 | Furnace Lockout

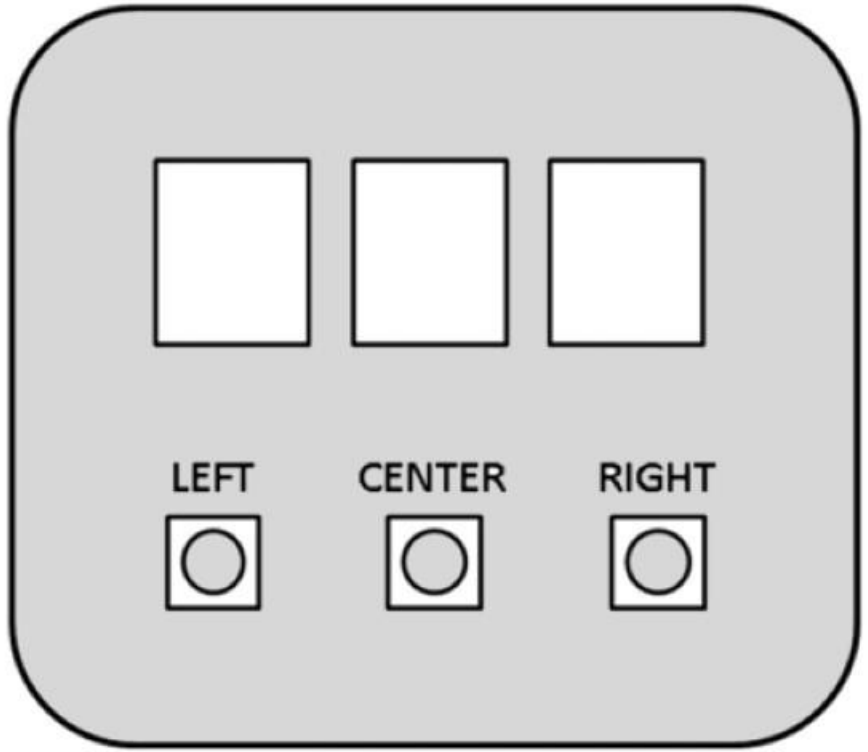
- Results of 3 failed attempts to achieve ignition during a single call for heat
- Displays EE0 on the 7-segment display
- How to reset:
- Automatic Reset – Occurs after 1 hour
- Manual Reset – Interrupt 115vAC to furnace
- Manual Thermostat Cycle – Cancel 24vAC call for heating for up to 20 seconds, then reset previous call for heating
- If the condition which originally caused the lockout still exists, the control will return to lockout



Settings

No Display

- Check for voltage to the furnace and low voltage at the control board.
- Check for blown fuse or tripped circuit breaker.
- If the above check out ok, it's possible that the control has determined that it has an internal fault.
- The control board should be replaced ONLY after all other checks have been verified.
- A full list of error codes and troubleshooting steps are available in the service manual.

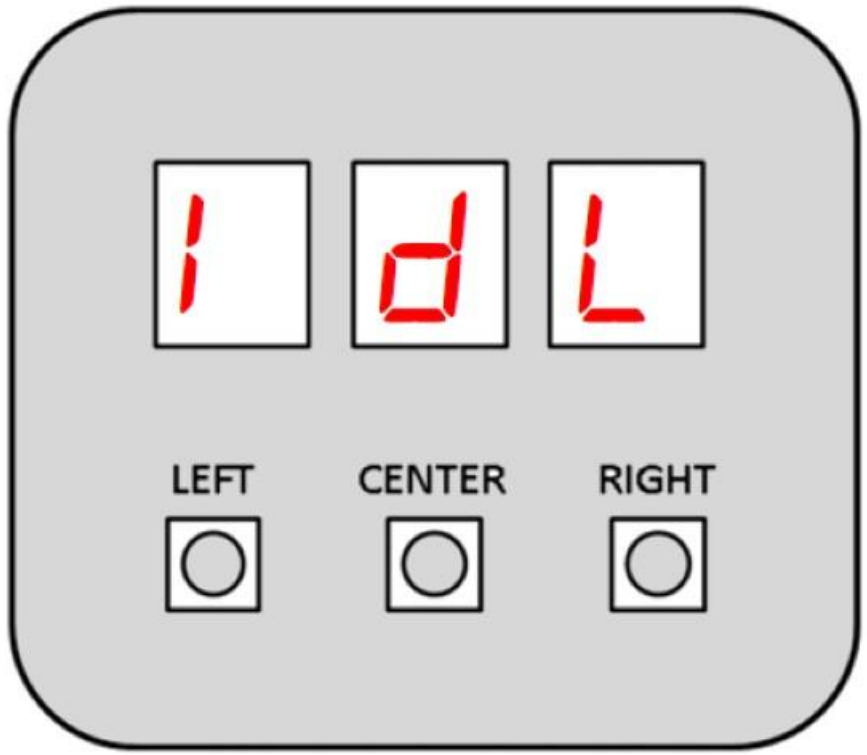


Settings

Indoor Unit Improperly Set Up For Non-Communicating Outdoor Unit

Indoor unit circuit board displays IdL during a call for air conditioner or heat pump operation

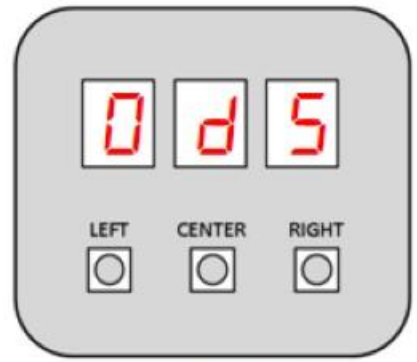
- Occurs when a communicating indoor unit is paired with a non-communicating outdoor unit and the indoor unit has not been properly set up
  - Ensure low voltage thermostat wiring connects to both the indoor and outdoor units
  - Set the outdoor unit type using the CoolCloud™ HVAC application or the indoor units OdS menu
  - Set the outdoor unit size using the CoolCloud™ HVAC application or the indoor units ton menu



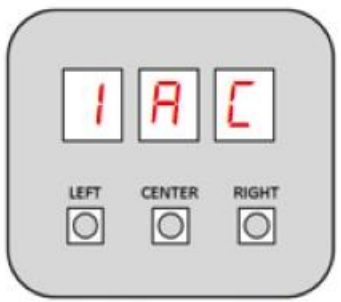
Settings

Setting Non-Communicating Outdoor Unit Type | Push Buttons

- Use the **Left** or **Right** buttons to locate the Outdoor Setting menu (OdS)
- Use the **Center** button to select the Outdoor Setting menu when code OdS is shown on 7-segment displays
  - Currently selected menu item will appear
- Use **Left** or **Right** button to select outdoor unit type – OFF, 1AC, 2AC, 1HP or 2HP
- Enter and confirm selection by pressing the **Center** button twice

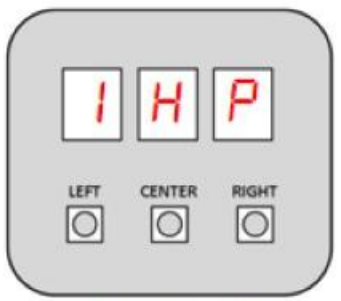


Outdoor Setting Menu



Single-Stage AC

Two-Stage AC



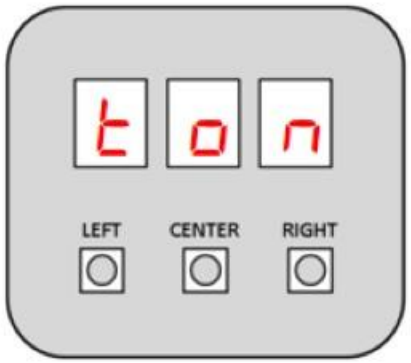
Single-Stage HP

Two-Stage HP

Settings

Setting Non-Communicating Outdoor Unit Tonnage | Push Buttons

- Use the **Left** or **Right** buttons to locate the outdoor unit's Tonnage menu (ton)
- Use the **Center** button to select the Tonnage menu when code ton is shown on 7-segment displays
  - Currently selected menu item will appear



Selection	Airflow	Selection	Airflow	Selection	Airflow	Selection	Airflow
1	400	2.3	920	3.6	1440	4.9	1960
1.1	440	2.4	960	3.7	1480	5	2000
1.2	480	2.5	1000	3.8	1520	5.1	2040
1.3	520	2.6	1040	3.9	1560	5.2	2080
1.4	560	2.7	1080	4	1600	5.3	2120
1.5	600	2.8	1120	4.1	1640	5.4	2160
1.6	640	2.9	1160	4.2	1680	5.5	2200
1.7	680	3	1200	4.3	1720	5.6	2240
1.8	720	3.1	1240	4.4	1760	5.7	2280
1.9	760	3.2	1280	4.5	1800	5.8	2320
2	800	3.3	1320	4.6	1840	5.9	2360
2.1	840	3.4	1360	4.7	1880	6	2400
2.2	880	3.5	1400	4.8	1920		

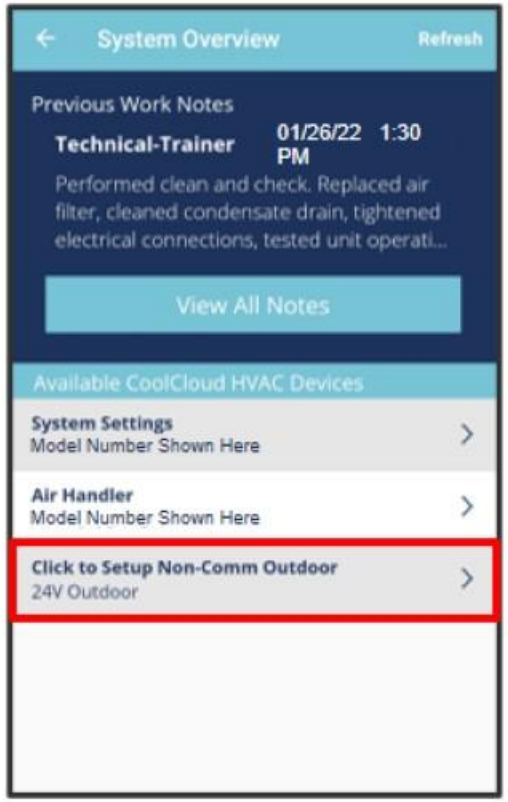
- Use **Left** or **Right** button to select outdoor unit tonnage
  - 1 ton = 400 CFM
  - Default is 6.0 tons
- Press **Center** button twice to enter and confirm selection

ComfortBridge™ technology

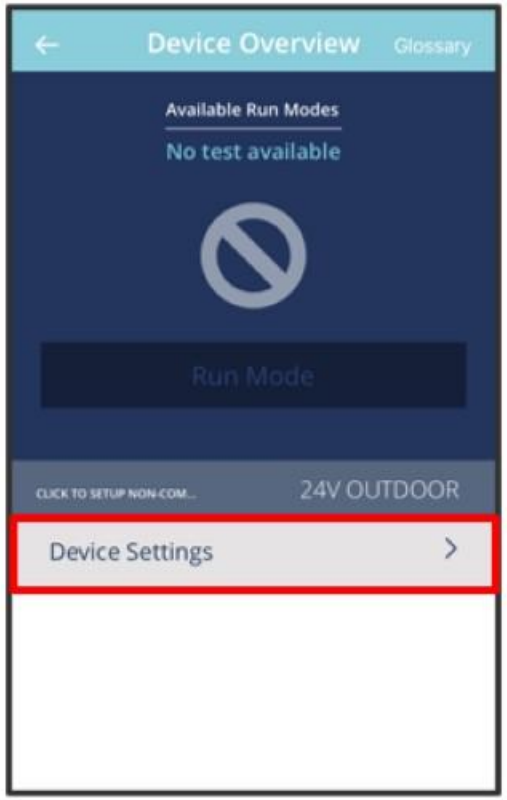
Settings

Setting Non-Communicating Outdoor Unit Type | Application

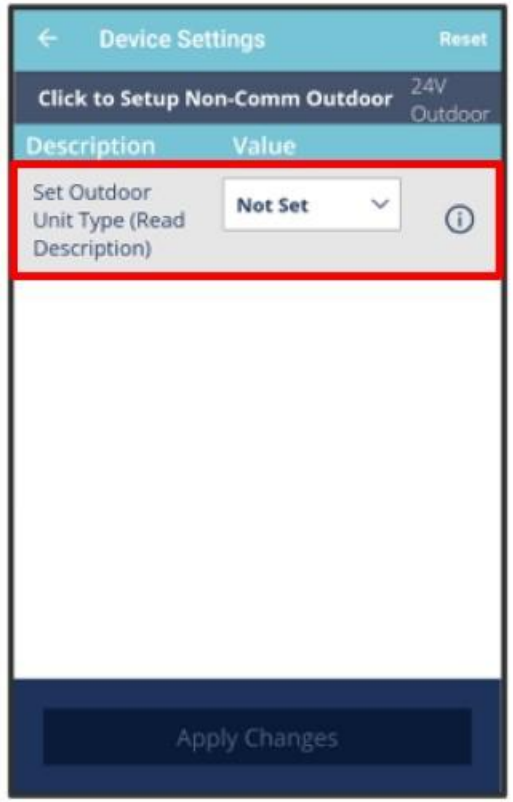
Select **Click to Setup Non-Comm Outdoor**



Select **Device Settings**



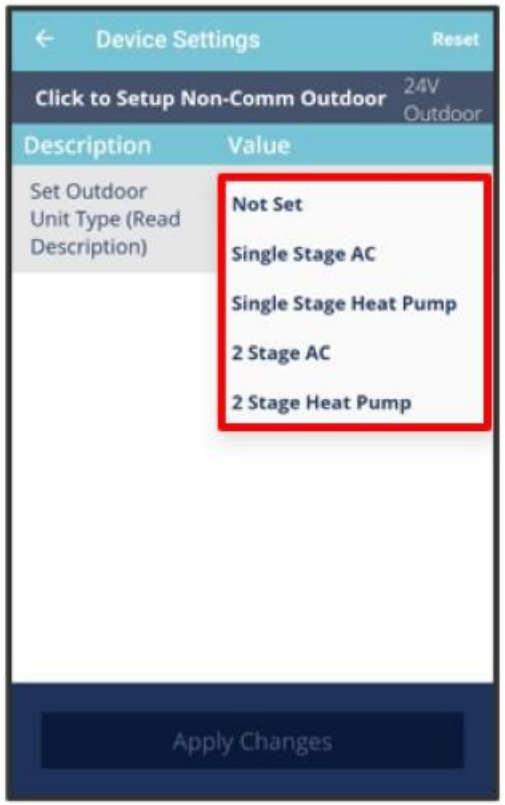
Select **Set Outdoor Unit Type**



Settings

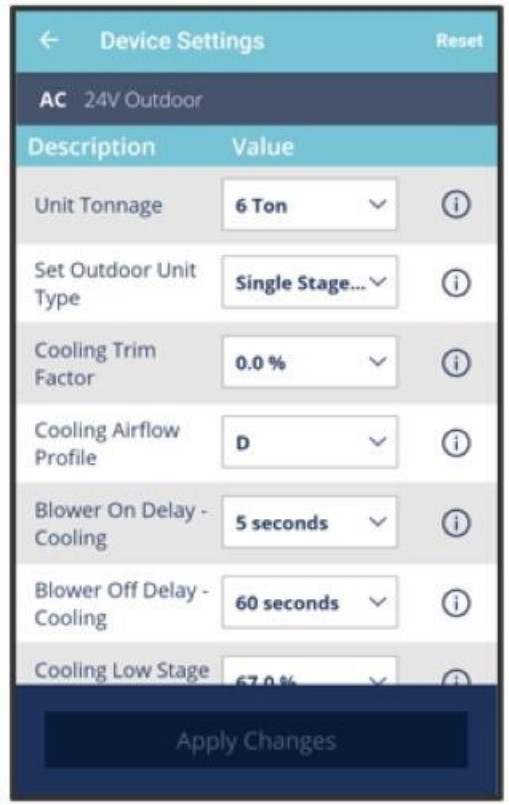
Setting Non-Communicating Outdoor Unit Type | Application

Select
Outdoor Unit Type



Press
Apply Changes

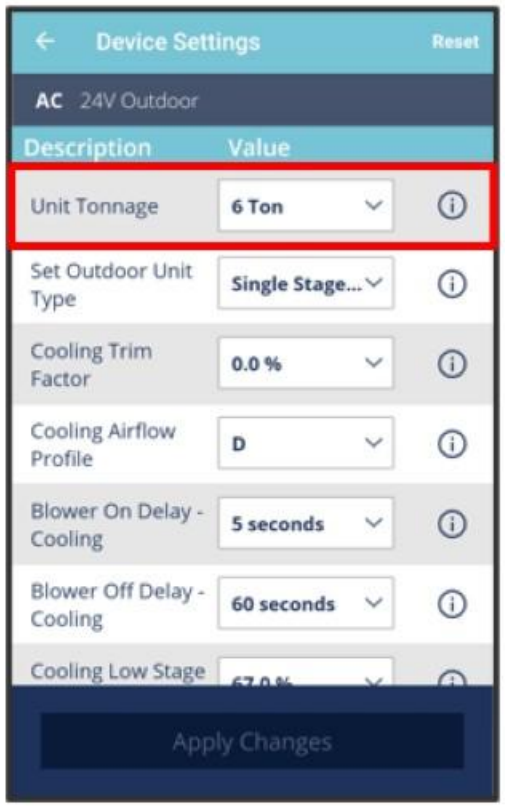
Unlocks Additional Menu Items



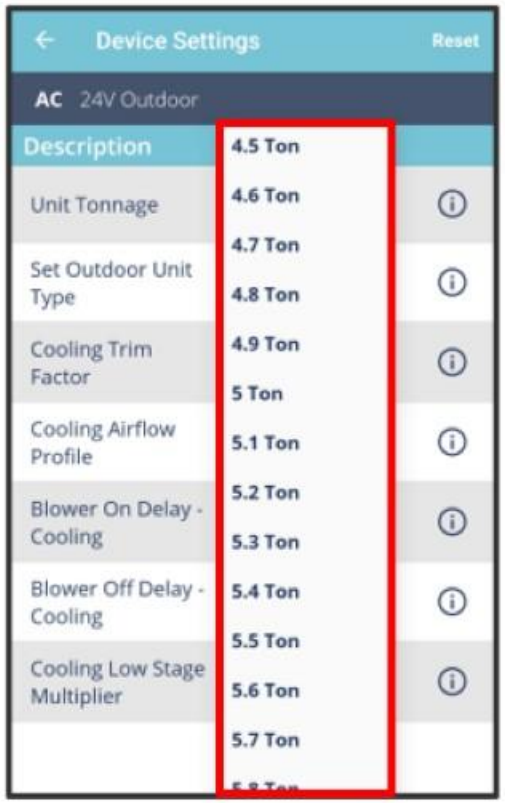
Settings

Setting Non-Communicating Outdoor Unit Tonnage | Application

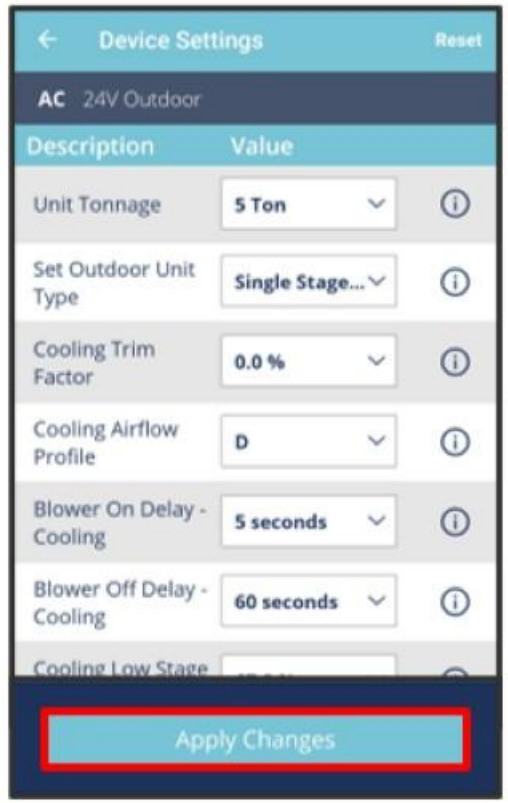
Select
Unit Tonnage



Select Outdoor
Unit Tonnage value



Press
Apply Changes



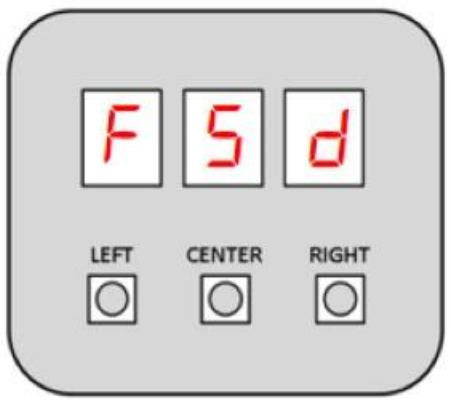
Settings

Constant Fan Airflow Multiplier

Continuous fan speed can be adjusted through the push buttons on the control board or through the CoolCloud HVAC app.

- **Constant Fan Airflow Multiplier** (FSd) is used to set the indoor blower speed for continuous fan operation
  - Operates when thermostat fan switch is placed in the on position
  - Setting is based on the percentage of blower capacity
    - Example: 30% of 1200 CFM (3-ton) blower capacity = 360 CFM
  - Default setting is:
    - 30% Air Handlers and Modulating Furnaces
    - 25% 2-Stage Furnaces

Note: Communicating systems do not require airflow adjustments for Air Conditioning or Heat Pump operations



ComfortBridge™ technology

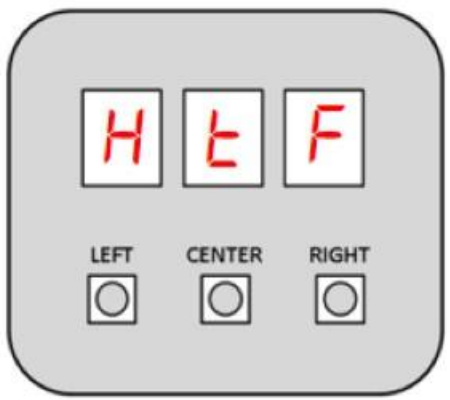
Settings

Trim Factors

Trim Factors can be adjusted if additional airflow adjustment is required

- Adjusting **Trim Factors** will increase or decrease percentage of CFM being delivered by the indoor blower.
  - Cooling Trim Factor – (CtF)
  - Heating Trim Factor – (HtF = heat Pump, 9tF = Gas Furnace)
- **Trim factors** can be adjusted ± 10% in 2 % increments
- Inverter outdoor units will have **Trim Factors** for:
  - High – Cooling (CtH) Heating (HtH)
  - Intermediate – Cooling (Cti) Heating (Hti)
  - Low – Cooling (CtL) Heating (HtL)

Note: **Trim factors** are set independently in each devices Device Setting Menu.

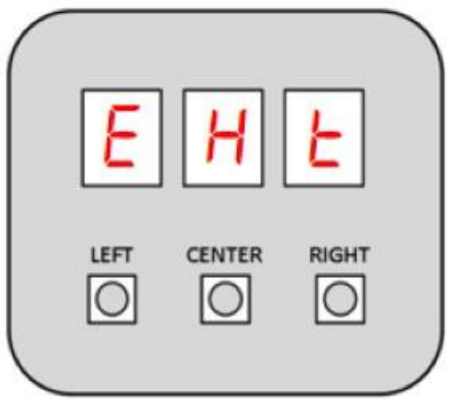


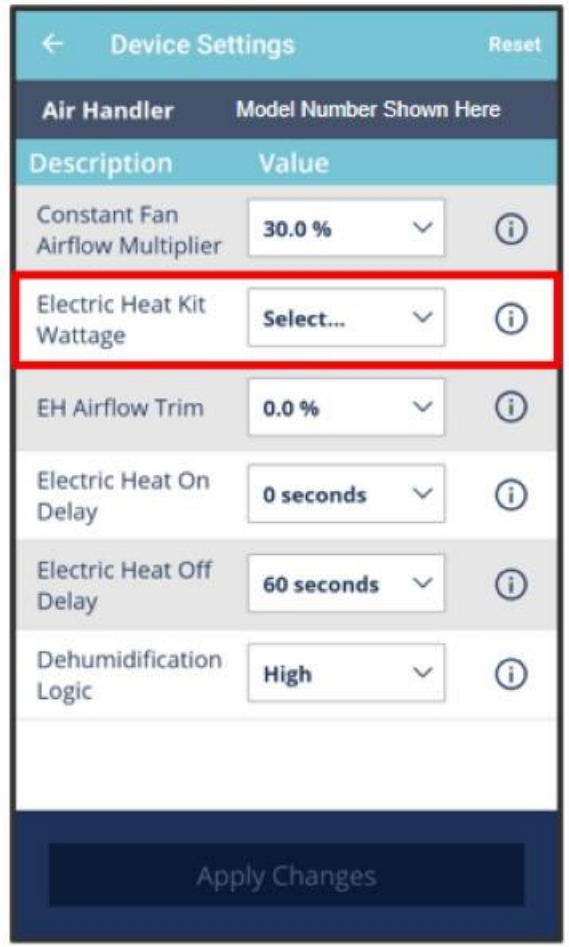
Settings

Electric Heat Kit | Air Handlers Only

If an Electric Heater is added to a ComfortBridge Air Handler, You must enter the **Electric Heat Kit Wattage**

- Setting the heater size
  - Informs the air handler that an electric heat kit has been installed
  - Sets the required indoor air flow during heater operation
  - Example 003 = 3kW heater kit
  - Default setting is 0 (No Heat Kit)





Note: Air Handler will not operate electric heat until a heater size is entered.

ComfortBridge™ technology

Settings

Electric Heat Kit | Airflow

HTR kW	AVPTC25B14	AVPTC29B14	AVPTC29B14 AVPTC29B14	AVPTC31C14	AVPTC31C14	AVPTC37C14 AVPTC39C14	AVPTC49C14 AVPTC59C14	AVPTC37D14	AVPTC49D14 **	AVPTC59D14	AVPTC61D14 **
3	550	550	550	600	600	NR	NR	NR	NR	NR	NR
5	650	650	650	700	700	700	800	870	950	990	1030
6	700	700	700	770	750	770	800	970	1060	1110	1150
8	800	800	800	880	850	880	950	1060	1150	1200	1250
10	850	875	875	970	920	970	1090	1120	1220	1240	1320
15	875	875	1050	1090	950	1090	1290	1220	1520	1520	1650
19	NR	NR	NR	1280	NR	1280	1345	NR	NR	NR	NR
20	NR	NR	NR	NR	NR	NR	NR	1250	NR	1520	1690
21	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
25	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	1750

Example chart shown - Airflow Values

ComfortBridge™ technology

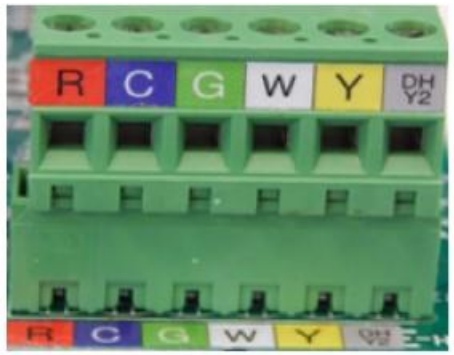
Settings

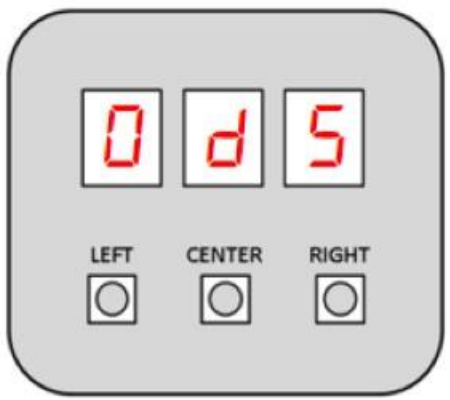
DH/Y2 Terminal

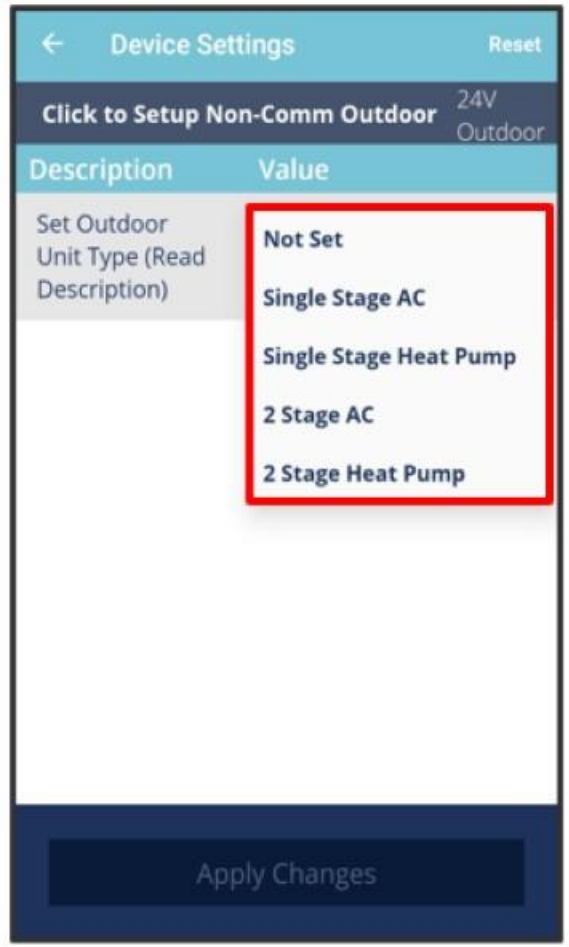
DH/Y2 Terminal input is configured based on outdoor unit type

- Communicating outdoor units
  - Terminal is used for dehumidification input (DH)
- Non-communicating outdoor units
  - DH/Y2 input changes automatically based on type of outdoor unit selected in Outdoor Setting menu (0d5)
    - 1AC or 1HP = Dehumidification (DH)
    - 2AC or 2HP = Second stage compressor (Y2)

Note: Dehumidification feature is not available on 2-stage non-communicating outdoor units







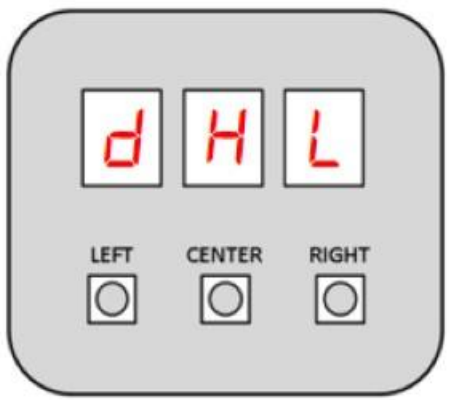
Settings

Dehumidification Logic

The 24 VAC Dehumidification input can be connected to a de-humidistat

- **Dehumidification logic** (dHL) can be selected by the user
  - High – Closed contacts between R & DH enable Dehumidification
  - Low – Open contacts between R & DH enable Dehumidification
- When the Dehumidification input is activated, cooling indoor blower CFM is decreased by 15%
  - Lowers the coil temperature
  - Extends cooling cycle
  - Increases dehumidification of conditioned air

Note: DH/Y2 terminal is used for second stage compressor on two-stage non-communicating units



ComfortBridge™ technology

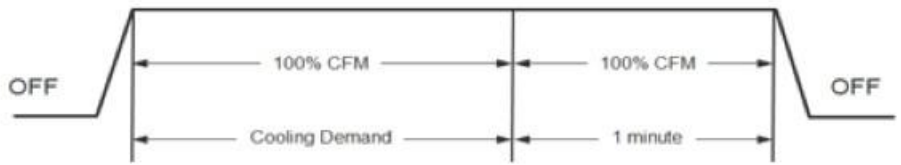
Settings

Airflow Profile

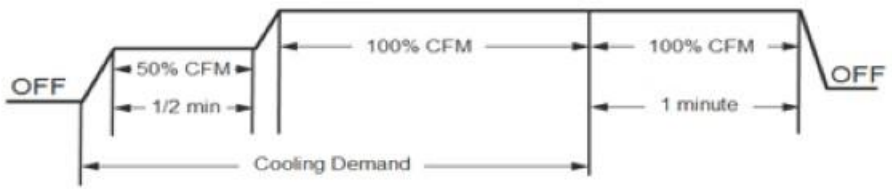
The variable-speed blower motor offers four **Airflow Profiles** to enhance cooling performance and increase comfort levels

- **Airflow Profiles** are shown as **A**, **B**, **C**, & **D** in application, and 1, 2, 3, & 4 on 7-segment display

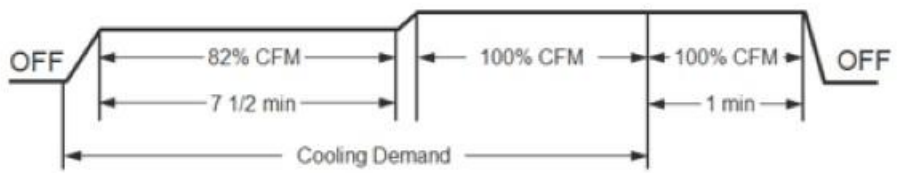
A = 1



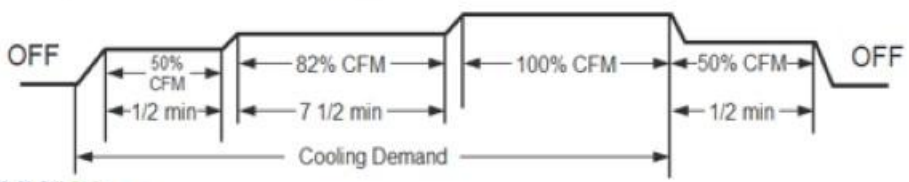
B = 2



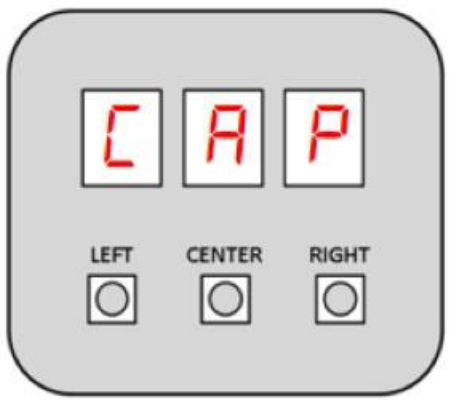
C = 3

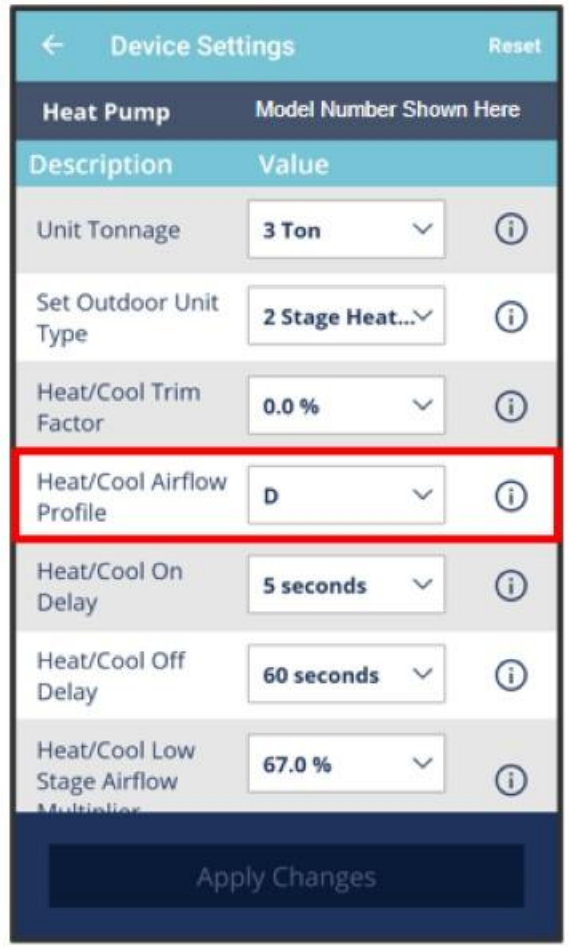


D = 4



Note: Profile D is the default setting





ComfortBridge technology

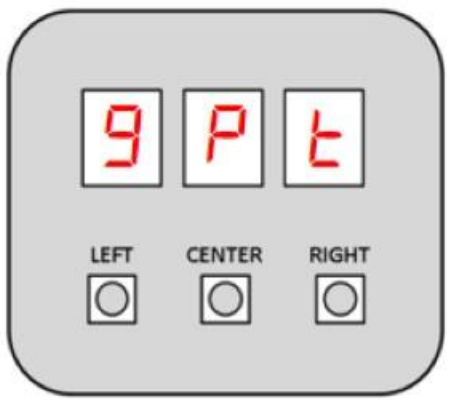
Settings

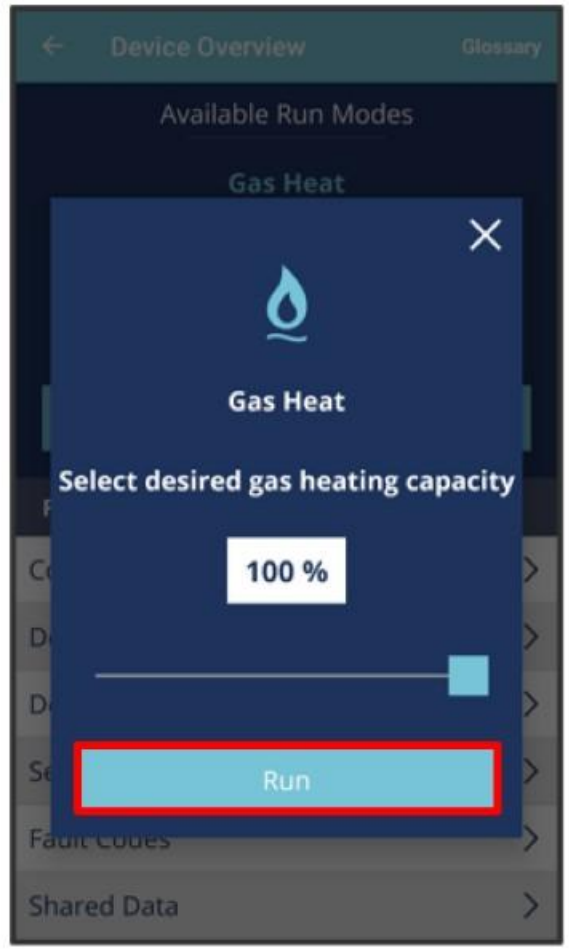
Gas Pressure Test | Modulating Furnaces Only

*MVM97 & *CVM97 ComfortBridge modulating gas furnaces must have their gas pressure set at 100% firing rate.

- Using CoolCloud application
  - Select furnace run mode
  - Adjust slider to 100%
  - Press Run to begin test
- Using push buttons and seven segment displays
  - Use left or right button to locate **Gas Pressure Test** (GPt)
  - Press center button to select
  - Press left or right button to change no to YES
  - Press Center button twice to begin test

Note: Allow furnace supply and return temperatures to stabilize before adjusting.





ComfortBridge™ technology

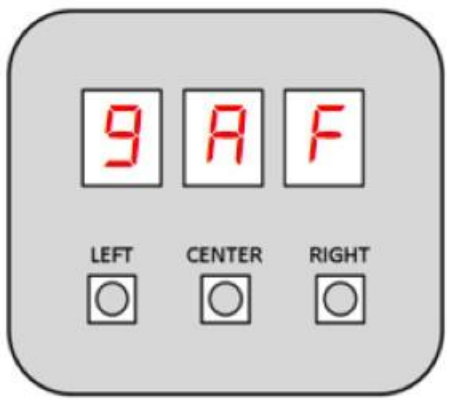
Settings

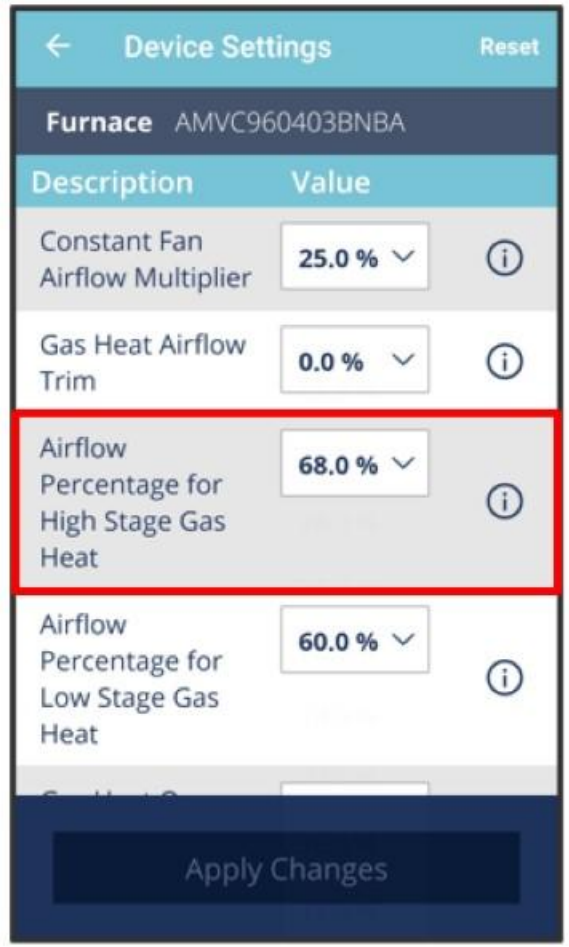
Gas Heating Airflow | Two-Stage Furnaces Only

Two–stage ComfortBridge furnaces have an adjustable **Gas Heating Airflow** (9AF) for high stage heating airflow

- Default setting varies and is factory set
  - Provides a temperature rise near the middle of the acceptable range
- Can be adjusted to increase comfort levels if desired
- Setting is a percentage of the blower's maximum airflow
  - CFM can be calculated by the following equation:
    - CFM = Blower maximum CFM X set percentage
    - Example – 1600 CFM blower set at 75%
      - 1600 X .75 = 1200 CFM

Note: If changing setting, ensure furnace temperature rise remains within acceptable range





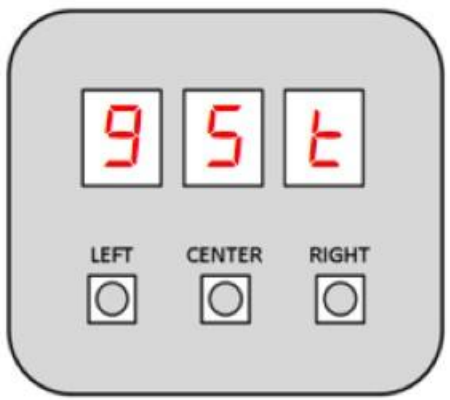
ComfortBridge™ technology

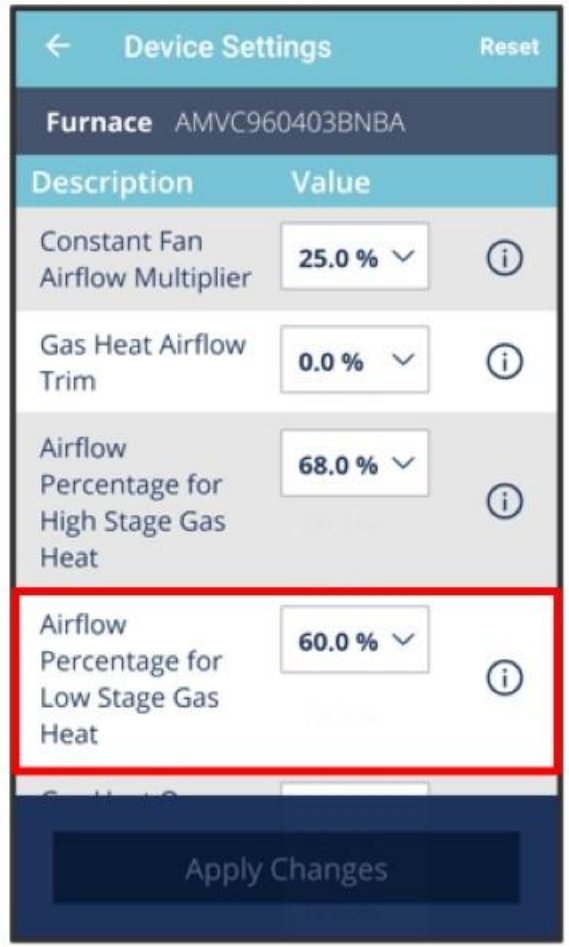
Settings

Gas Heating Stage Multiplier | Two-Stage Furnaces Only

Two–stage ComfortBridge furnaces have an adjustable **Gas Heating Stage Multiplier** (95t) for setting low stage heating airflow

- Default setting is 70 % of high stage CFM
  - Can be adjusted to increase comfort levels if desired
- Setting is a percentage of the furnace's high fire airflow
  - CFM can be calculated by the following equation:
    - CFM = High Fire CFM X set percentage
    - Example – 1200 CFM set at 70%
      - 1200 X .70 = 840 CFM





Note: If changing setting, ensure furnace temperature rise remains within acceptable range

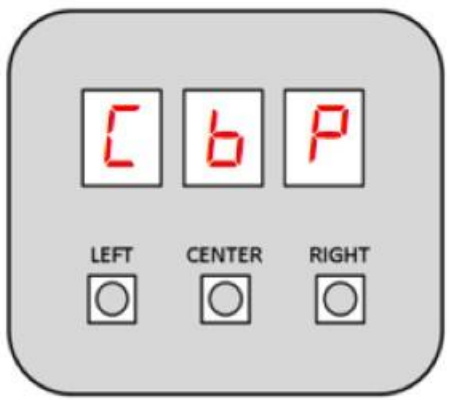
ComfortBridge™ technology

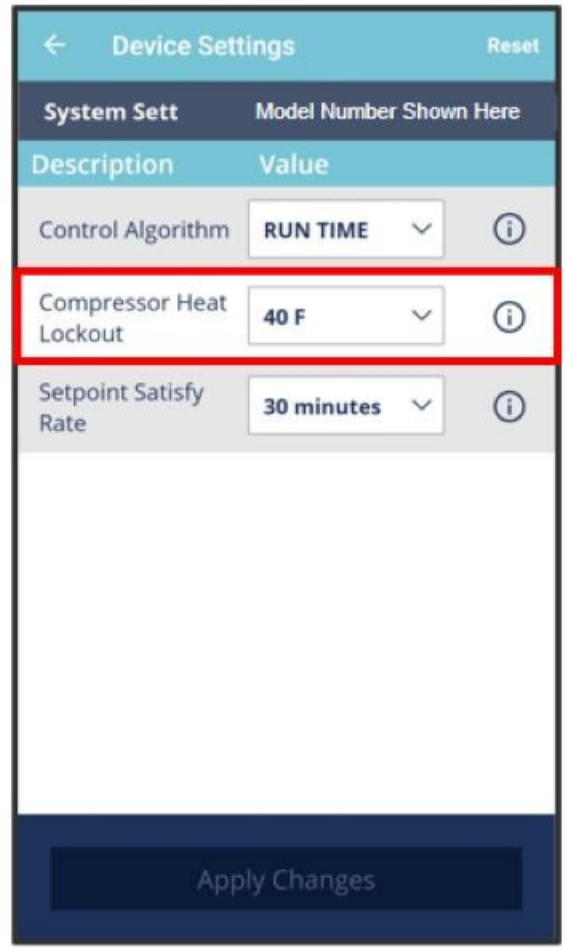
Settings

Compressor Balance Point | Communicating Heat Pumps Only

Temperature heat pump no longer operates is the **Compressor Balance Point** (CbP)

- Below this temperature compressor heating is locked out
- Gas or electric heating will act as the primary heat source



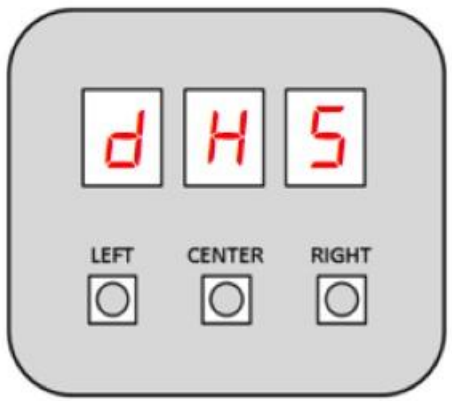


Settings

Defrost Gas Heat Stage

The **Defrost Gas Heat Stage** (dHS) sets the number of heating stages to operate during the defrost cycle.

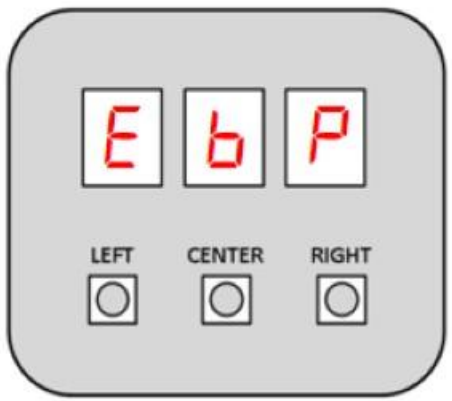
- 1 = low heat
- 2 = high heat (default)



Electric Heat Balance Point

Electric heating is disabled above the **Electric Heat Balance Point** (EbP) temperature.

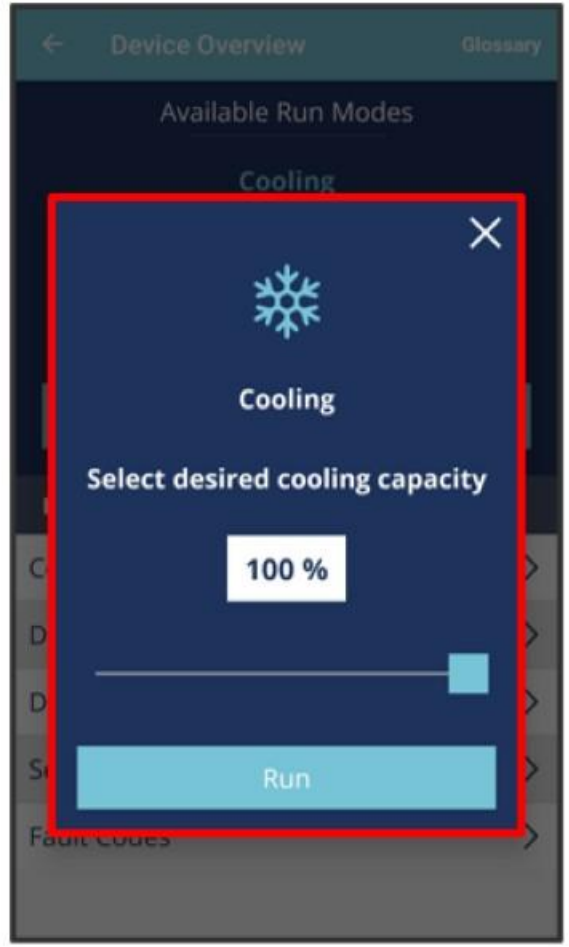
- Default temperature is 65°F



Settings

Outdoor Unit Charging | Communicating 2-Stage Units

- Cool Cloud HVAC app
  - Activate the desired Run Mode
  - To charge on high-speed run at 100%
  - To charge on low-speed run at any level below 50%
- Manually
  - Disconnect power to the indoor equipment for more than five minutes.
  - Cycle the unit on with the thermostat and charge during the first two cycles for high-stage operation.
  - For low-stage charging cycle the system a third time, the third cycle will automatically move to low-stage operation.

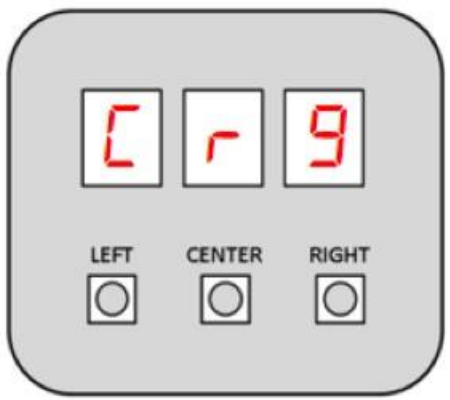


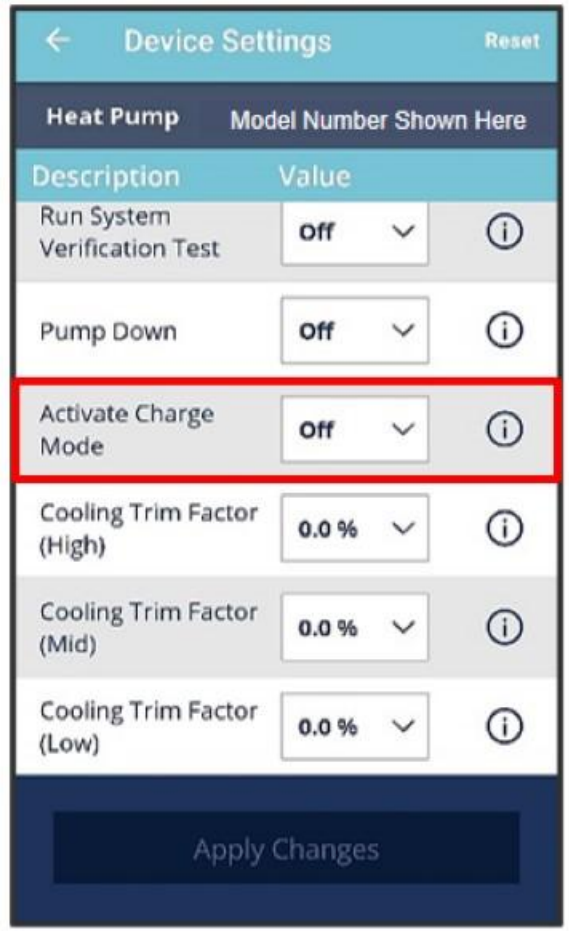
Settings

Activating Charge Mode | Communicating Inverter Units

Inverter units must be in **Charge Mode** to check superheat and sub-cooling.

- **Charge Mode:**
  - Operates the compressor at 100% capacity for 60 minutes.
  - May manually disengaged or will automatically terminate after 60 minutes.
- Cool Cloud HVAC app
  - Select Activate Charge Mode from the outdoor unit's Device Settings menu.
- Push Button Menu
  - Select Cr9 from the control board menu.





Review

What Menu on the push button display allows you to set up an electric heater?

EHt

What is used to lock out the compressor in heat mode below a specified temperature?

Compressor Balance Point (CbP)

What must be activated if I want to check or adjust charge on an inverter?

Charge Mode (Cr9)

The continuous fan speed setting is a percentage of _____?

Maximum Indoor Blower CFM

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ComfortBridge™ FCC statement

FCC Statement

- This device contains transmitter module FCC ID: QOQBGM111; IC: 5123A-BGM111.
- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.
- Any changes or modifications not expressly approved could void the user's authority to operate the equipment.
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter meets both portable and mobile limits as demonstrated in the RF Exposure Analysis.